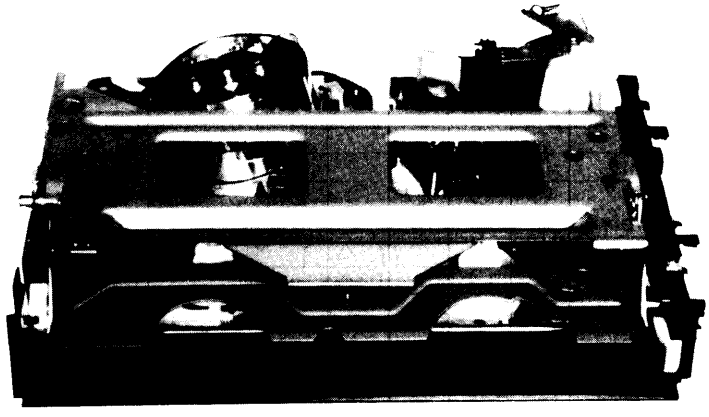
FILE NO.

SANYO

BASIC SERVICE TECHNICAL INFORMATION

Video Cassette Recorder

V95 T MECHANISM



VHS
PAL SECAM NTSC

Contents

REFERENCE No.MM541172

1. MAINTAINING AND CHECKING THE MECHANISM

1-1. REGULAR CHECKS AND MAINTENANCE ITEMS

To obtain full function and maximum performance from the set, and to stop it getting dirty or scratched, we recommend that you carry out the following maintenance procedures and regular checks. The maintenance checks described in the following section should also be carried out without fail after carrying out any repairs to the set.

NOTE: OIL AND GREASE

- Always use the specified brands of oil and grease. If you use a grease with the wrong viscosity, for example, this can lead to all sorts of problems. Be careful to keep the oil and grease free of dust and foreign bodies.
- A "drop" of oil is the amount of oil remaining on the tip of a rod with a diameter of 1.5mm after it is dipped in oil to a depth of 1cm and then taken out.

1-1-1. REGULAR CHECKS

○Cleaning ◎Check △Oil □Check, Replace

Part maintained \ Hours of use (H)		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape path system	Band brake assembly		◎				□				◎	
	BT lever assembly	○	○	○	○	○	○	○	○	○	○	
	Full erase head	○	○	○	○	○	□	○	○	○	○	
	Cleaner roller assembly		◎		◎		□		◎		◎□	
	Guide roller assembly	○	○	○	○	○	○	○	○	○	○	
	S incline mounting assembly	○	○	○	○	○	○	○	○	○	○	
	T incline mounting assembly	○	○	○	○	○	○	○	○	○	○	
	ACE head	○	○	○	○	○	□	○	○	○	○	
	Pinch roller lever assembly	○	○	○	○	○	□	○	□	○	○	
	Pinch lift mounting										□	
	Pinch lift cam										□	
	Pinch cam gear										□	
	Cylinder earth assembly								□			
	Cylinder complete	○	○	○	○	○	○	○	○	○	○(□)	
	Upper cylinder assembly	○	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	
Reel drive system	Supply reel assembly		○		○△		○		○△		○	
	Take up reel assembly		○		○△		○		○△		○	
	S reel gear		△		△		△		△		△	
	T reel gear		△		△		△		△		△	
	Reel pulley		△		△		△		△		△	
	Special washer 2.4 x 6 x 0.25						◎				◎	
	Clutch mounting complete		△		△		△		△		△	
	Reel belt				□				□			
	Capstan motor	○	○	○	○	○	○	○	○	○	□	
	Friction gear assembly				△				△□			
Brake system	S brake assembly		◎		◎		◎		◎		◎	
	T brake assembly		◎		◎		◎		◎		◎	
	Capstan brake assembly		◎		◎		◎		◎		◎	
	T soft brake assembly		◎		◎		◎		◎		□	
Loading drive system	Loading motor assembly		◎		◎		◎		◎		□	
	Damper				◎						□	
	Worm gear complete				◎						□	
	Main cam				◎						□	
	Special washer 3.6 x 0.5				◎						□	
	Wheel gear 1				◎						□	
	Wheel gear 2				◎						□	
	Mode switch				◎						□	
	Crescent slide				◎						□	
	S load gear				◎						□	
	Front rack gear				◎						□	
	Rack gear				◎						□	
	Pinion gear				◎						□	
Perform-ance checks	Back tension torque		◎		◎		◎		◎		◎	PB back tension torque: 30~50g/cm
	FF, REW torque		◎		◎		◎		◎		◎	FF, REW: more than 600g•cm
	PLAY torque		◎		◎		◎		◎		◎	PLAY (8h): 55~110g•cm
	REV torque		◎		◎		◎		◎		◎	REV: 110~210g•cm

This periodic maintenance check table changes considerably according to the using conditions and environment.
Refer to POWER ON TIME, HEAD ON TIME for the length of time the unit has been used.
As life may be shortened if foreign particles and dusts remain accumulated on the tape guides and rotating and contacting portions, clean if dirty.
Dusts and other foreign particles on the tape guides may also shorten the tape life and lower picture quality, therefore clean thoroughly.

1-2. SERVICE TOOLS AND CLEANING

1-2-1. SERVICE TOOLS

NOTES ON ALIGNMENT TAPES

Select a PAL or NTSC alignment tape from the list below, according to the transmission system of the VCR you are repairing.

PAL: For models with 625 scanning lines and a field frequency of 50Hz

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

No.	Tool	Tool No.		Remarks
		NTSC	PAL	
1	Alignment tape	VHJ-0005	VHJ-0008	SP colour bar 1kHz (normal)
2	Alignment tape	VHJ-0006	VHJ-0009	SP monoscope 7kHz (normal)
3	Alignment tape	VHJ-0007	———	EP monoscope
4	Alignment tape	———	VHJ-0052	LP monoscope
5	Alignment tape	VSJ-1001	———	EP mode 3kHz (normal)
6	Eccentric screw driver	VHJ-0003		Used to adjust the tape path
7	Nut box	VHJ-0048		Used to adjust the height of the lever load assembly
8	Torque dial gauge	VHJ-0004		Used to measure reel winding torque
9	Cassette torque meter	VHJ-0016		Used to measure back tension torque
10	Load lever assembly height adjustment tool	VHJ-0111		Used to adjust the height of the load lever assembly
11	Torque gauge screwdriver	VHJ-0014		Used to adjust the tightening torque of screws
12	3 mm dia. bit for torque screwdriver	VHJ-0045		Used to replace the bit of the torque gauge screwdriver
13	Video head removing tool	VHJ-0041		Used to remove the upper cylinder
14	Oil	VHJ-0099		
15	Grease	VHJ-0100		
16	Grease	VHJ-0101		
17	Relay cables	VHJ-0110		Relay cables of mechanism and CP-1 PWB assembly

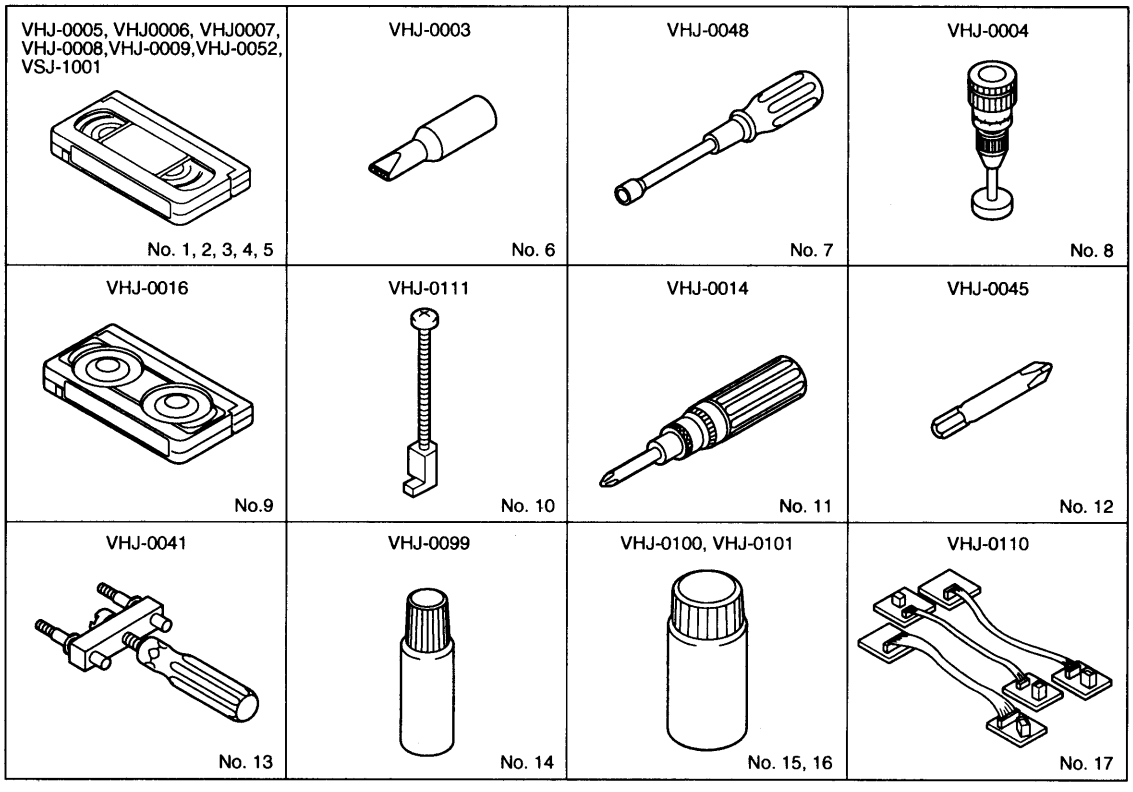


Fig.1-2-1

1-2-2. Using the Relay Cable (VHJ-0106)

The mechanism can be repaired without using the relay cable (VHJ-0110). As shown in Fig. 1-2-2, the relay cable (VHJ-0110) is a tool used for relay between the CP-1 PWB assembly and mechanism unit.
When connecting it, take note of the pin number of the connector.

NOTE 1: Do not place the mechanism upright as shown in Fig. 1-2-2 when inserting/ejecting the cassette.

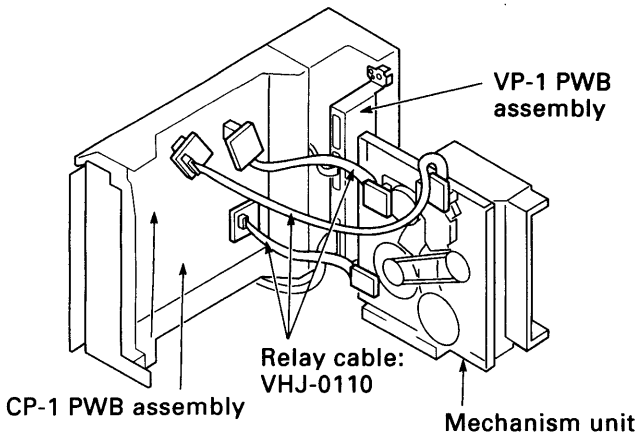


Fig. 1-2-2

1-2-3. CLEANING

1. Cylinder (Drum) (See Fig.1-2-3)

Moisten a chamois with methyl alcohol and clean the video head and the tape path surface of the cylinder. Be sure to wipe horizontally in relation to the video head. If you wipe vertically, or use excessive force, you can damage the video head.

2. Tape Path System / Reel Drive System

Clean the pinch roller, the capstan shaft, the tape guides, the FE head, the ACE head, the reel table, the pulley and the reel belt with a soft cloth, or chamois, moistened with methyl alcohol.

NOTE: If the dirt on the tape guide cannot be cleaned off, replace the tape guide.

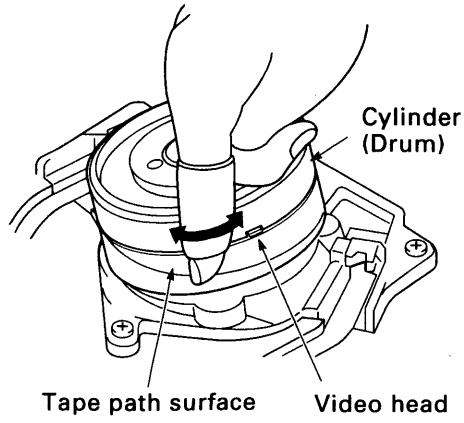


Fig.1-2-3

2. AN OVERVIEW OF THE MECHANISM

2-1. NAMES OF THE MAIN PARTS

2-1-1. CASSETTE MECHANISM ASSEMBLY

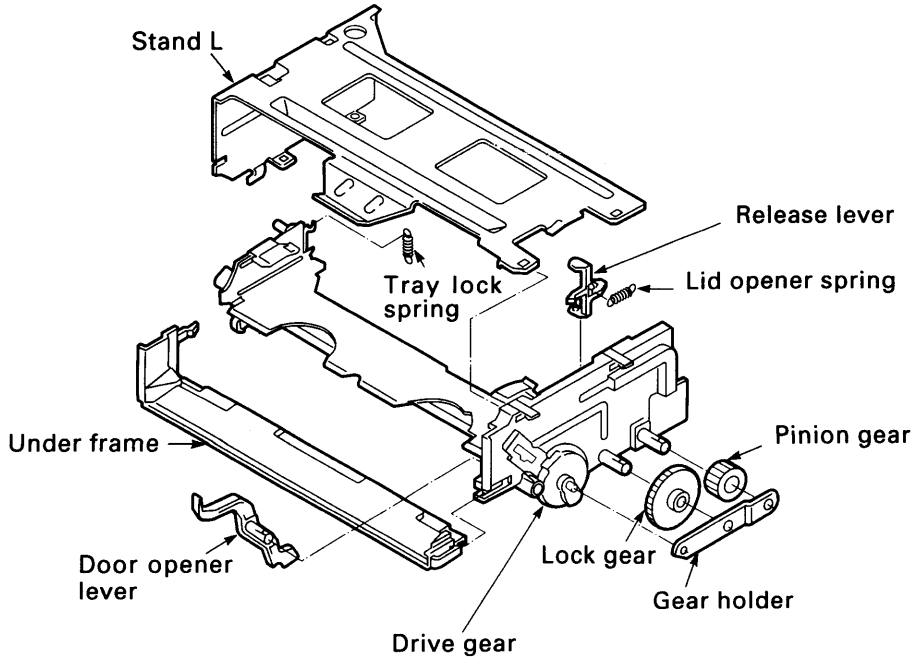


Fig. 2-1-1

2-1-2. TOPVIEW

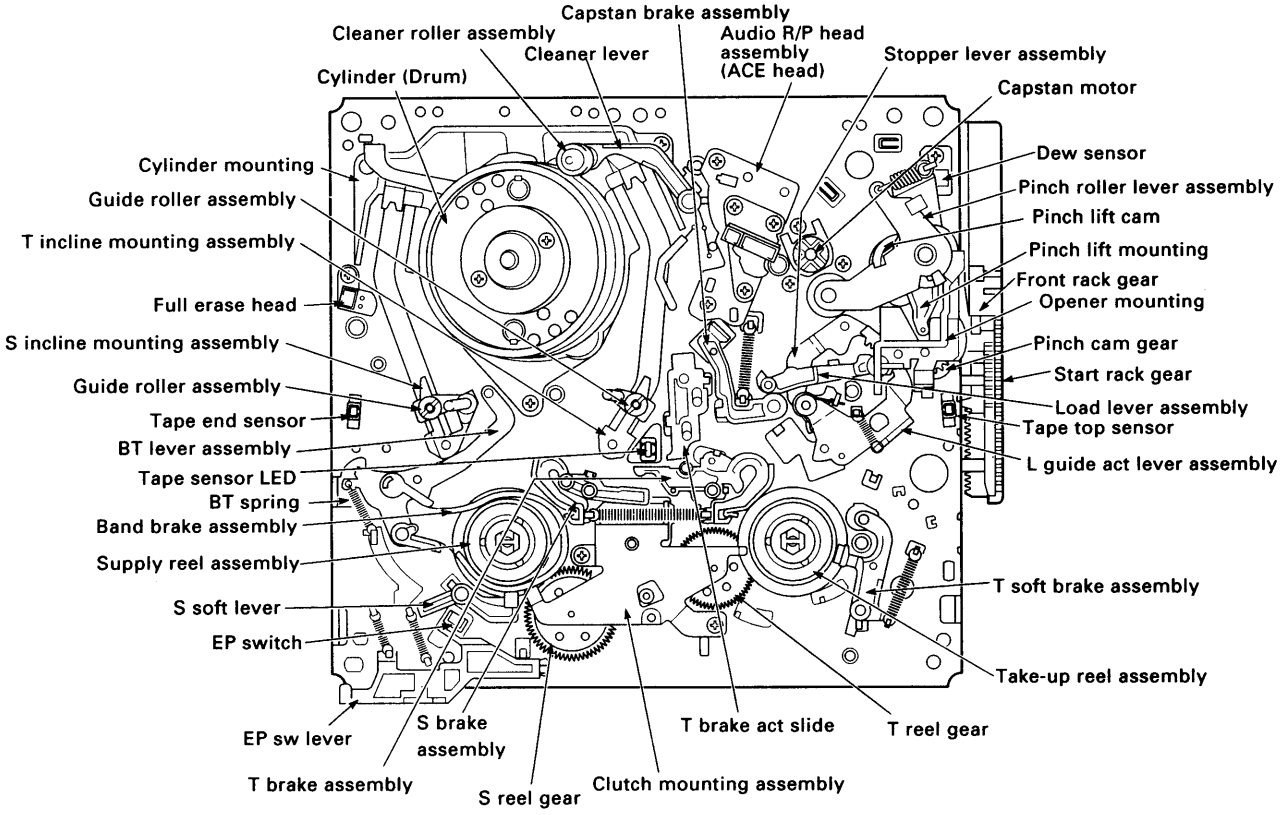


Fig. 2-1-2

2-1-3. UNDERSIDE

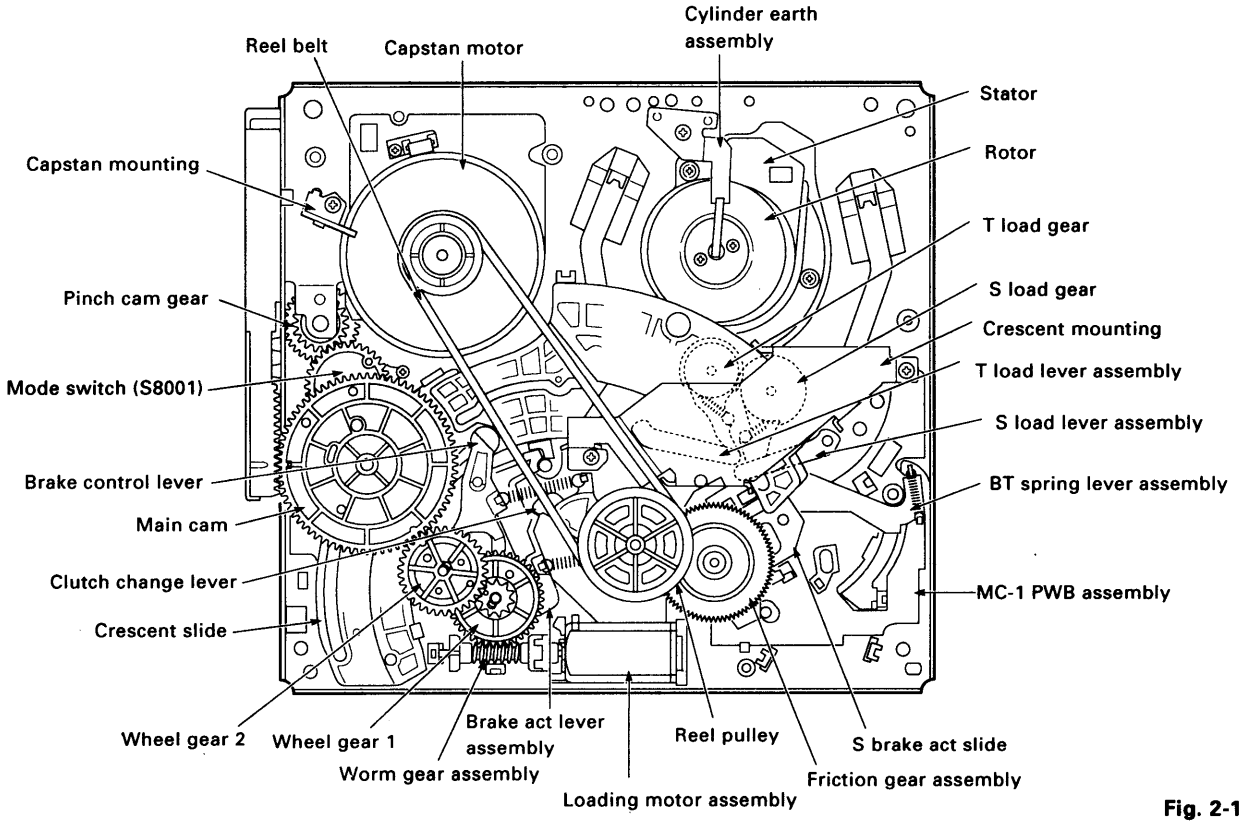


Fig. 2-1-3

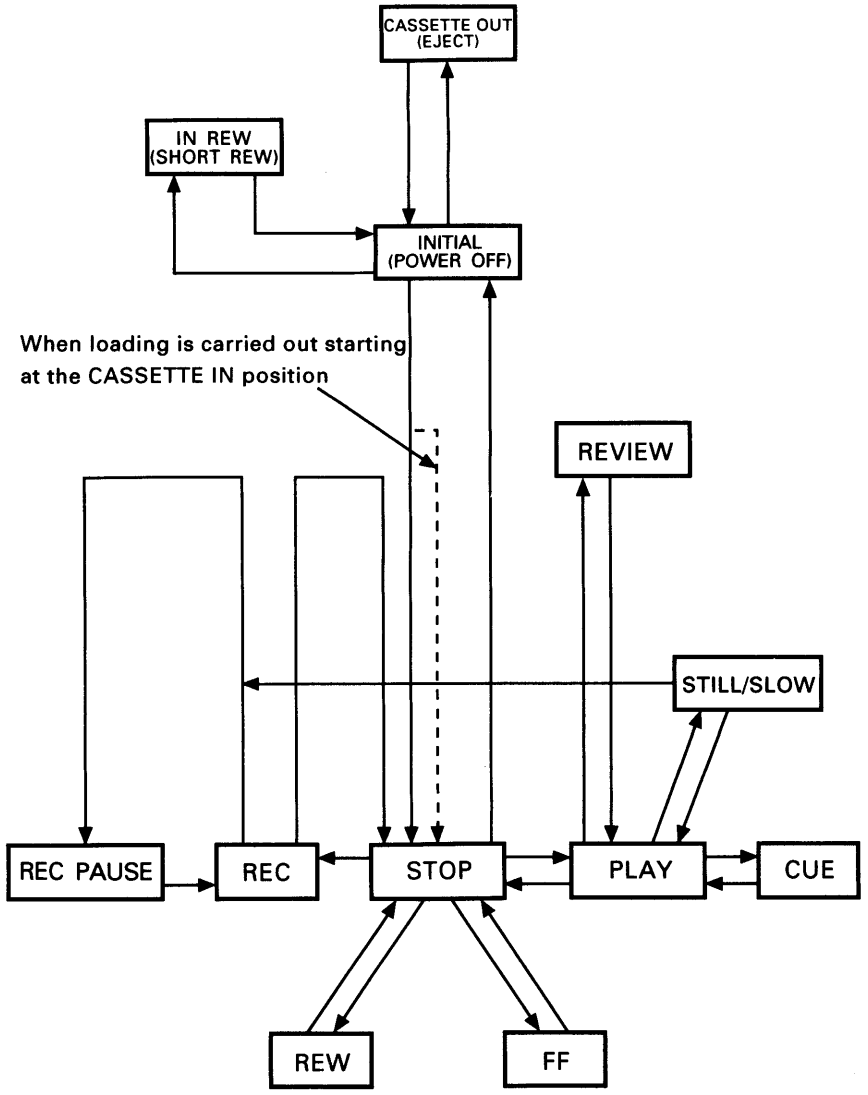
2-2. AN OVERVIEW OF THE MECHANISM MODES

2-2-1. MECHANISM MODE SWITCHING TABLE

NOTE: The letters and figures enclosed in circles in the mechanism mode column are the codes on the crescent slide.

HEX DATA	Mechanism mode
6	EJECT Ⓔ Distinguished by whether the EP switch is ON or OFF. Horizontal shift section. Vertical shift section.
2	IN REW Ⓡ
0	
7	INITIAL ⑦
0	Cleaner roller assembly: ON
1	S/T mounting incline assembly pressure begins.
0	S/T mounting incline assembly pressure ends.
1	REVIEW ①
0	IDLER pos. ② (Pinch roller OFF)
2	
0	
3	STILL/SLOW ③
0	
5	PLAY/STOP ⑤
0	
4	BRAKE pos. ④
0	
6	FF/REW ⑥

The principal mode-switching states of the mechanism



MODE SWITCH OUTPUT TABLE

HEX DATA	X	Y	Z
0	H	H	H
1	H	H	L
2	H	L	H
3	H	L	L
4	L	H	H
5	L	H	L
6	L	L	H
7	L	L	L

X: SW DATA 2
Y: SW DATA 1
Z: SW DATA 0

H: 5V
L: 0V
Low active

APPEARANCE OF MODE SWITCH AND RELATIONSHIP BETWEEN MODE POSITIONS

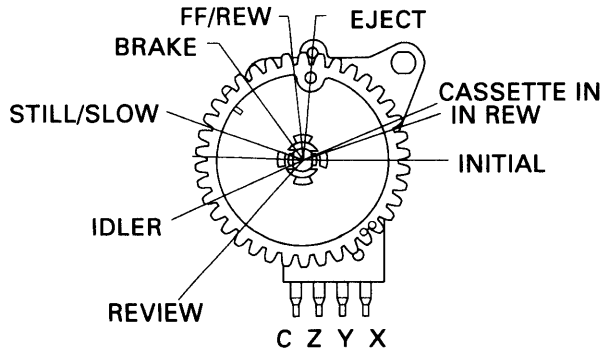


Fig.2-2-1

2-2-2. MOVEMENT CHECK LIST FOR THE MAIN PARTS OF THE MECHANISM

(S): Strength (W): Weakness

Principal parts \ Mechanism mode	EJECT	IN REW	INITIAL (POWER OFF)	(LOADING)	(UNLOADING)	REV	IDLER	STILL/SLOW	PLAY/STOP	BRAKE	FF/REW	
T brake assembly	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON/OFF	
S brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON/OFF	
T soft brake assembly	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	
S soft lever	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
BT lever assembly	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
BT spring	OFF	OFF	OFF	OFF	OFF	ON(W)	ON(W)	ON(S)	ON(S)	ON(S)	ON(W)	
Pinch roller lever assembly	UP	UP	UP	UP/ DOWN	DOWN/ UP	ON	OFF	ON	ON	OFF	OFF	
Clutch mounting assembly	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	FF	
Load lever assembly	UNLO	UNLO	UNLO	LO	LO	LO	LO	LO	LO	LO	LO	
Capstan brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	
S and T incline mounting assembly				LO	UNLO							
Cleaner roller assembly	OFF	OFF	OFF	(ON)	(ON)	OFF	OFF	OFF	OFF	OFF	OFF	

2-2-3. HOW TO CHECK THE MECHANISM MODE POSITION

You can tell which mode the mechanism is currently in by looking at the codes and marking-lines on the crescent slide on the underside of the mechanism chassis. The edge of the crescent mounting is used as the reference line, as shown in Fig.2-2-2, and the marking-lines and symbols indicating the mechanism modes are displayed on the crescent slide, which slides against the edge of the crescent mounting. The mechanism mode is read off from the marking-line on the slide crescent which is aligned with the reference-line on the crescent mounting.
Example: In Fig.2-2-2, marking-line 6 is aligned with the reference-line on the crescent mounting, so the mechanism is seen to be in FF/REW mode.

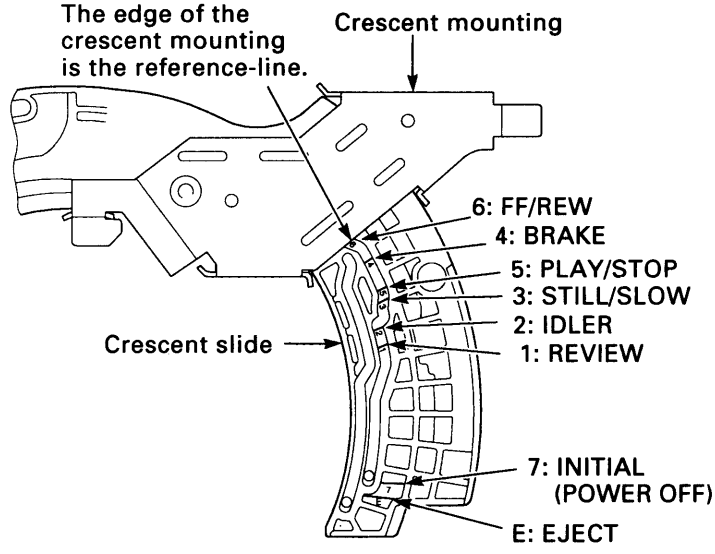


Fig.2-2-2

2-2-4. SELF-DIAGNOSIS DISPLAY

Some models are equipped with the SELF-DIAGNOSIS DISPLAYS function.
Use it as a means of finding out the symptoms and cause of the error before performing repairs.
For details, refer to the separate service manual for the respective models.

3. DISASSEMBLING THE MAIN PARTS OF THE MECHANISM

POINTS TO NOTE

- When fitting the parts of the mechanism, refer to the "Assembly Notes", and proceed in the reverse of dis-assembly order.
- Dis-assembly and assembly should be carried out in EJECT mode unless a movement mode is explicitly specified. EJECT mode is the state in which the cassette tape has been ejected.
- Clamps are used to prevent parts coming loose. When removing a clamp, be careful not to force it, as this can result in damage.

3-1. HOW TO MAKE THE MECHANISM MOVE

In order to check a movement such as front loading, front unloading, tape loading, tape unloading, raising/lowering and pressing the pinch roller, you will need to operate the loading motor. There are two methods of operating the loading motor, and these are explained in sections 3-1-1. The above movements can also be performed without operating the loading motor, by following the method explained in section 3-1-2.

3-1-1. OPERATING THE LOADING MOTOR BY THE MANUAL METHOD (See Fig.3-1-1)

1) Refer to section 3-2 and install the mechanism unit.
2) Using your finger, turn the loading motor located at the rear of the mechanism unit. For EJECT, turn the loading motor in the direction of the arrow on the loading motor. For PLAY or FF/REW, turn it in the opposite direction.
   When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
   Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.
   When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2).

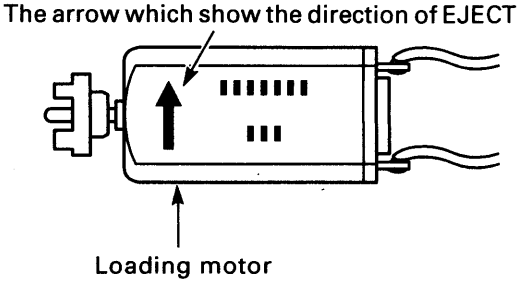


Fig.3-1-1

3-1-2. MAKING THE MECHANISM MOVE USING THE MANUAL METHOD

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) If you turn the main cam counterclockwise, the mechanism will switch to a mode such as PLAY or FF/REW. To switch from FF/REW mode to EJECT mode, turn the main cam clockwise.

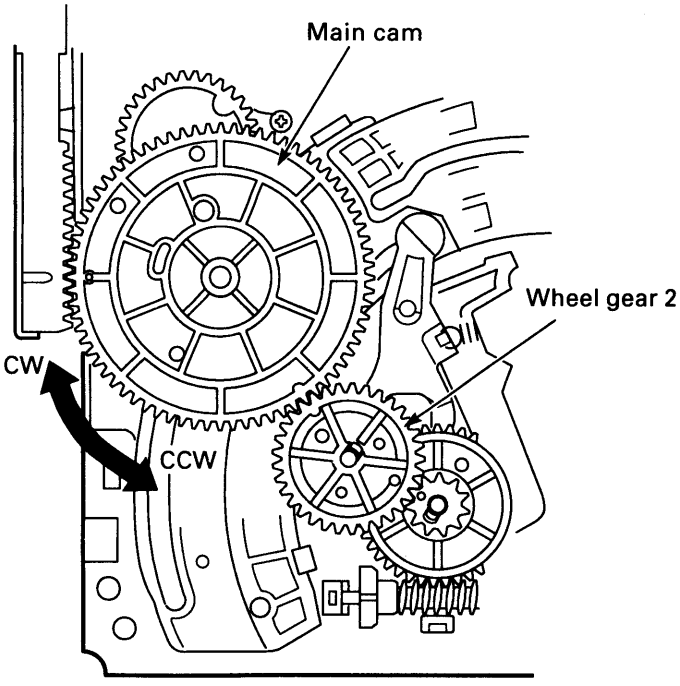


Fig.3-1-2

3-2. MECHANISM UNIT (See Figs. 3-2-1 and 3-2-2)

1) Remove the top cover, bottom cover and front cabinet assembly.
2) Unplug the flat cable ① from the VM-1/VP-1 PWB assembly on the cylinder (drum), and unplug the ACE head connector ②.
3) Unplug the dew sensor connector ⑩.
4) Remove the two screws ③, then remove the VM-1/VP-1 PWB assembly ④, lifting it upwards. The shape of the VM-1/VP-1 PWB assembly varies according to the model.
5) Remove the two screws ⑤ and the two screws ⑥, then lift up the mechanism unit. The tray ⑦ will stop you removing the two screws ⑤ on the front, so release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ shown in Fig.3-2-2, then slide off the tray ⑦. Move the tray by referring to section 3-1 and turn the loading motor in the PLAY direction.

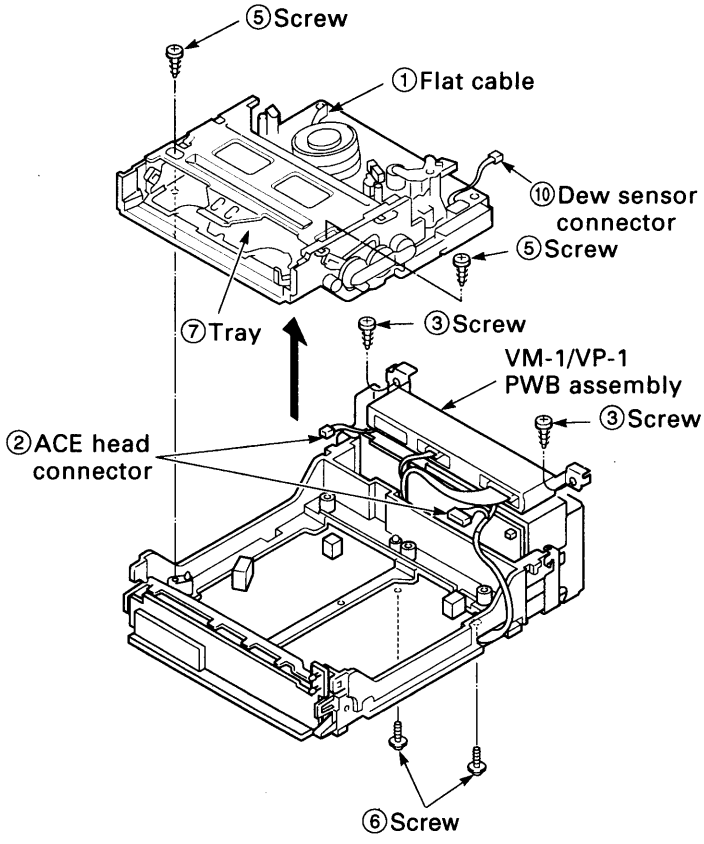


Fig.3-2-1

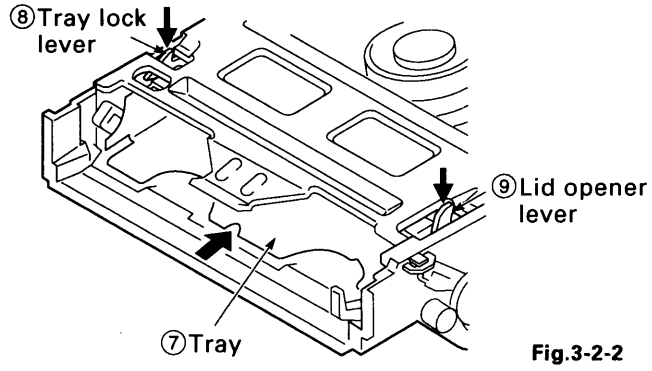


Fig.3-2-2

3-3. CASSETTE DRIVE MECHANISM

3-3-1. CASSETTE MECHANISM ASSEMBLY (See Figs.3-3-1 and 3-3-2)

1) Put the VCR into EJECT mode.
2) Remove the two screws ①.
3) Lift up the back of the cassette mechanism assembly ② slightly, and remove the two hooks ③ on the front.

ASSEMBLY NOTES:

1. The cassette mechanism assembly and the mechanism chassis should both be fitted in EJECT mode.
2. Check that the two hooks ③ have snapped into the mechanism chassis, and make sure that the two holes ④ in the cassette mechanism assembly are aligned with the two dowels ⑤ on the mechanism chassis.
3. Make sure that the big tooth on the pinion gear of the cassette mechanism assembly slots properly into the deepest gap in the start rack gear, as shown in Fig.3-3-2.
4. When fitting the two screws ①, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 5 kg/cm.

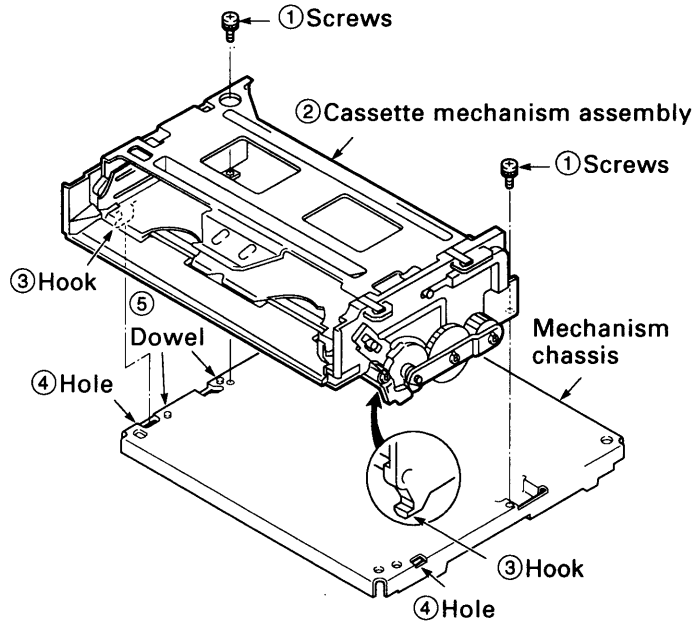


Fig.3-3-1

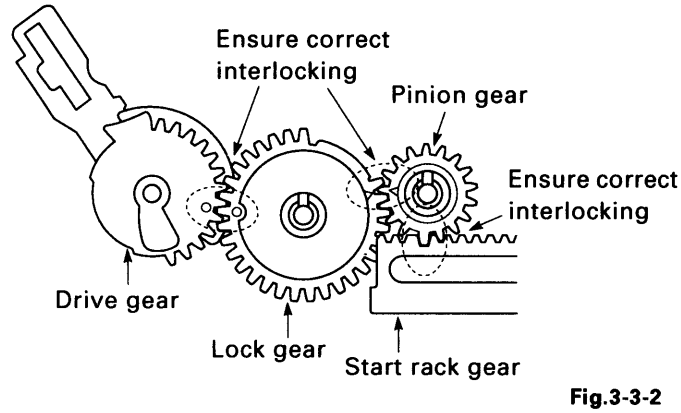


Fig.3-3-2

3-3-2. CASSETTE DRIVE GEAR (See Fig.3-3-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove clamps ① and ②, then remove the gear holder ③.
3) Remove the clamp ①, then remove the pinion gear ④.
4) Remove the clamp ②, then remove the lock gear ⑤.

ASSEMBLY NOTES:

1. Put the tray in the EJECT mode position before fitting any parts.
2. Apply grease (VHJ-0100) to the gear mounting shafts, all the gear teeth, and the cam part of the drive gear ⑥.
3. Ensure that the drive gear, the lock gear and the pinion gear interlock correctly, as shown in Fig.3-3-2.
4. Make sure the clamps ① and ② snap in to the gear holder ③.

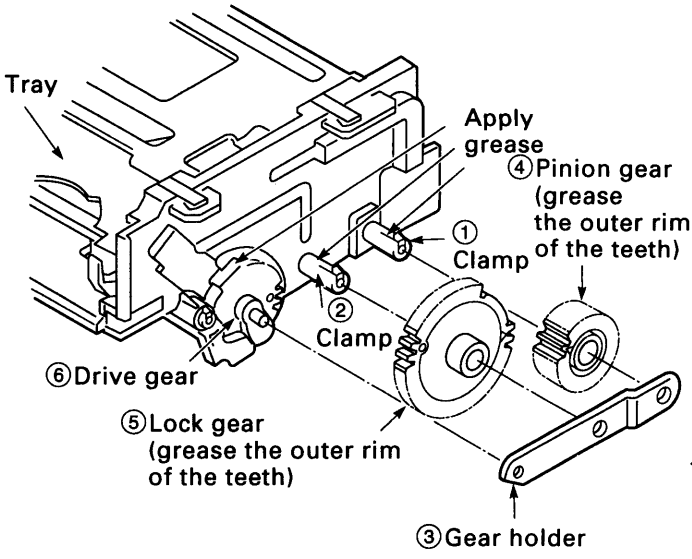


Fig.3-3-3

3-3-3. DOOR OPENER, UNDER FRAME AND STAND L (See Fig.3-3-4)

1) Remove the cassette mechanism assembly, referring to section 3-1.
2) Remove the two clamps ① and take out the under frame ②, pulling it towards you.
3) Press down the tray lock lever ③ and the lid opener lever ④, and loosen the tray ⑤, lifting it away from you. In this state, press the clamp ⑥ and remove the door opener lever ⑦.
4) Remove the two clamps ⑧ and take out the stand L ⑨. Be careful not to exert too much force on the clamps ⑧, as this could cause damage.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the grooves ⑪ on the stand L, the inside of the hole ⑬ in the drive shaft ⑫, and the mounting hole ⑭ in the door opener lever of the stand R.
2. Before fitting the stand L ⑨, be sure to move the tray ⑤ back as far as the EJECT mode position. Put the two pins ⑩ on the tray ⑤ into the grooves ⑪ on the stand L. Put the drive shaft ⑫ into the hole ⑬.
3. Be sure to fasten the two clamps ① and the clamp ⑥ on the stand R, and to fasten the two clamps ⑧ on the stand L.

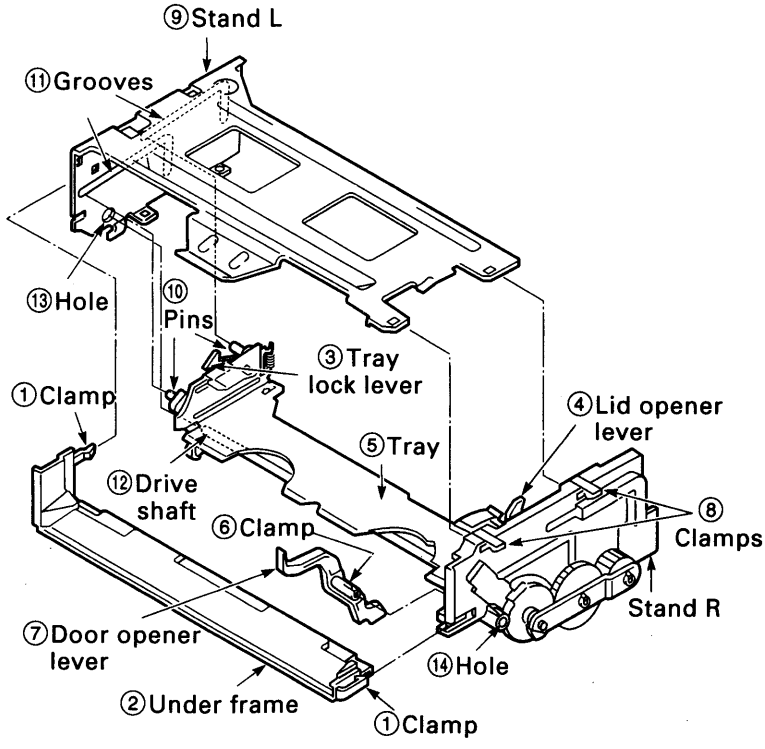


Fig.3-3-4

3-3-4. START RACK GEAR AND FRONT RACK GEAR (See Figs.3-3-5 and 3-3-6)

1) Remove the mechanism unit, referring to section 3-2.
2) Remove the cassette mechanism assembly, referring to section 3-3-1.
3) Remove the special screw ①. When you do this, slide the front rack gear assembly ② towards the front until it stops, then take it off the shaft ③. Take care not to damage the shaft ③.
4) Remove the spring ④.
5) Remove the clamp ⑥ on the front rack gear ⑤, then remove the start rack gear ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the front rack gear ⑤ and all over the inside of the groove on the start rack gear ⑦.
2. Align the positioning mark ⑧ on the front rack gear ⑤ with the mark ⑩ on the main cam ⑨.
3. When installing the cassette mechanism assembly, refer to section 3-3-1 and align the start rack gear with the pinion gear.

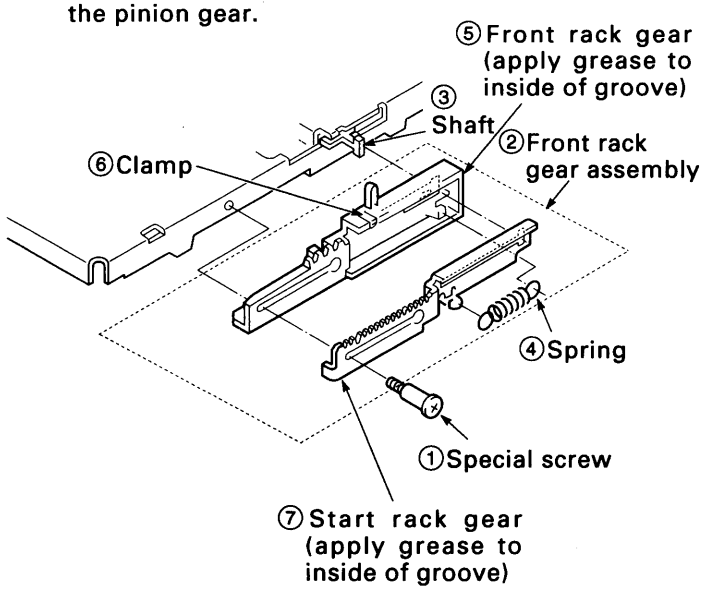


Fig.3-3-5

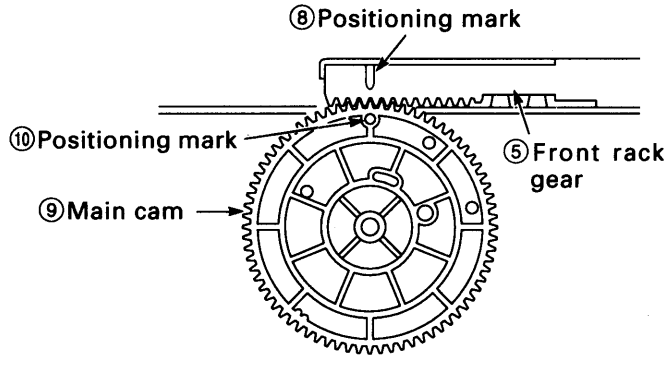


Fig.3-3-6

3-4. CLEANER ROLLER ASSEMBLY (See Fig.3-4-1)

1) Remove the clamp ① and take out the cleaner lever ②. When you do this, be careful not to bend the plastic springs Ⓐ and Ⓑon the cleaner lever ②.
2) Remove the clamp ③, and take out the cleaner roller assembly ④. Be careful not to touch the sponge on the cleaner roller assembly ④.

ASSEMBLY NOTES:

1. When mounting the cleaner lever ② on the shaft ⑤, press the clamp ① in the direction shown by the arrow, and snap it into the mounting ⑥ on the audio R/P head assembly.

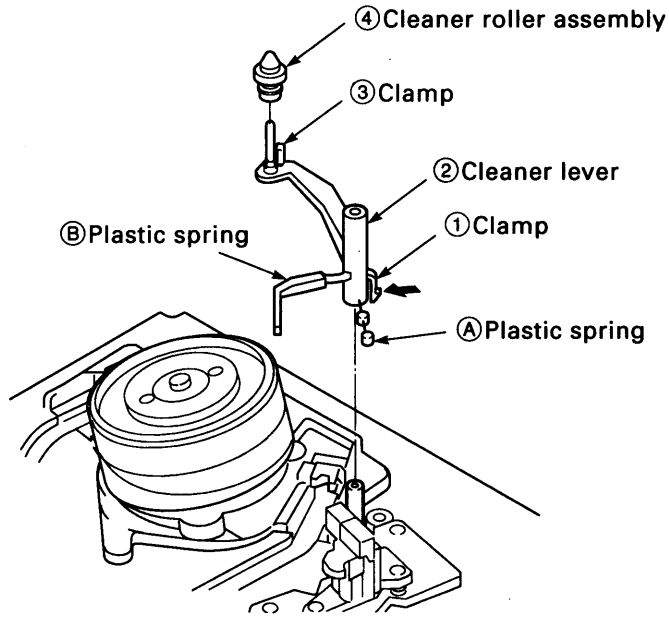


Fig.3-4-1

3-5. CYLINDER (DRUM)

3-5-1. UPPER CYLINDER ASSEMBLY (UPPER DRUM) (See Figs. 3-5-1, 3-5-2, 3-5-3,3-5-4)

1) Remove the two screws ① (See Fig.3-5-1).
2) First, tighten the handle ② of the video head removing tool (VHJ-0041), then screw the two long screws ③ evenly into the two screw holes ⑤ in the upper cylinder assembly (upper drum) ④ (See Fig. 3-5-2).
3) Hold the tool (VHJ-0041) so that the upper cylinder assembly (upper drum) ④ does not rotate, and at the same time, turn the handle ② clockwise, and remove the upper cylinder assembly (upper drum) ④.
4) Remove the tool (VHJ-0041) from the upper cylinder assembly ④.

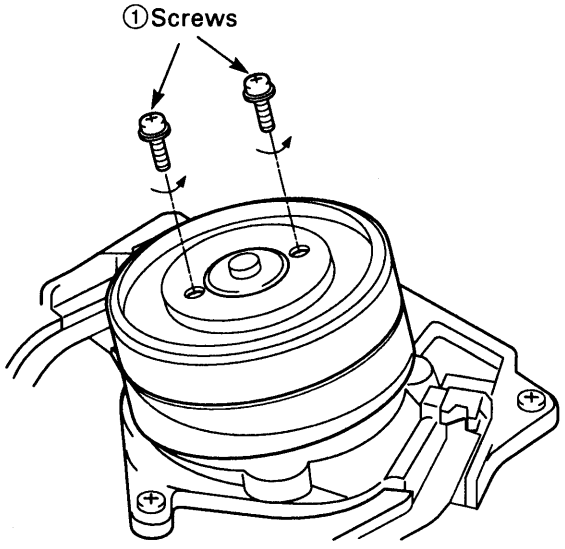


Fig.3-5-1

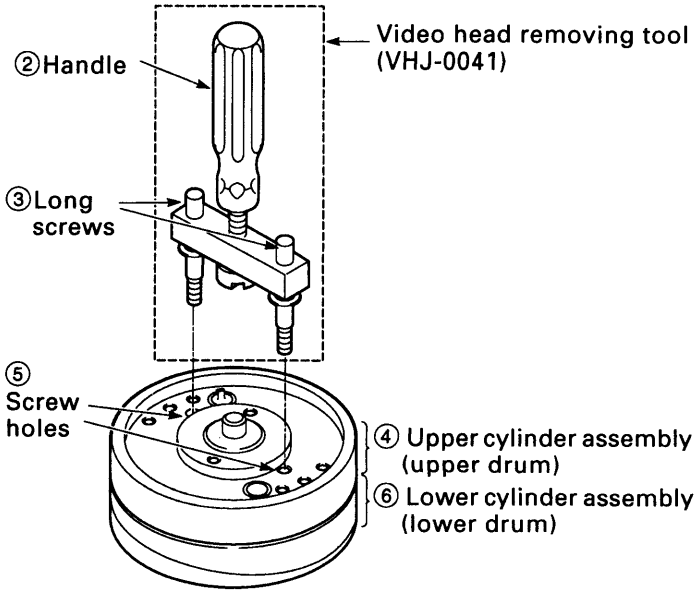


Fig.3-5-2

ASSEMBLY NOTES:

1. When carrying out assembly, the CH-1 head on the upper cylinder assembly (upper drum) ④ and the lower cylinder assembly (lower drum) ⑥ must be aligned. The CH-1 head on the upper cylinder assembly ④ bears a code ⑦ such as 2N4N-Q, 2N4P-QO, 2N4N-QL, 2N4P-QL, 2N4N-SQ, 2N4P-SQ...etc, as shown in Fig.3-5-3. The CH-1 on the lower cylinder assembly ⑥ has a round hole ⑧, as shown in Fig.3-5-4. Assemble the parts so that the round hole ⑧ is next to the code ⑦ on the upper cylinder assembly.
2. Be careful not to scratch the tape path surface of the cylinder. After replacing the cylinder, clean the tape path surface of the cylinder.
3. After replacing the upper cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the swithching position adjustment of the servo circuit.

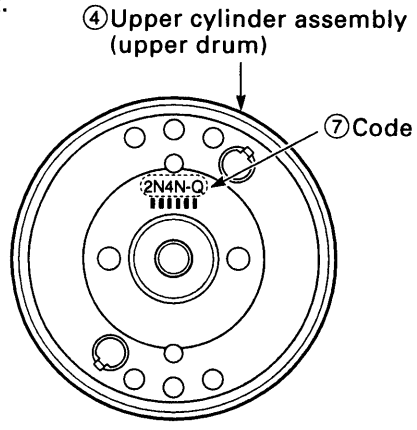


Fig.3-5-3

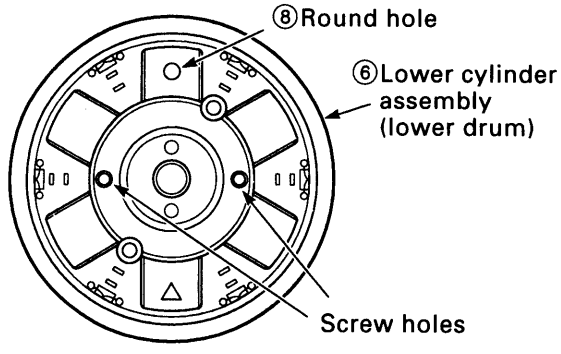


Fig.3-5-4

3-5-2. CYLINDER (DRUM) UNIT (See Fig.3-5-5)

1) Put the mechanism into EJECT mode.
2) Refer to section 3-2 and remove the VM-1/VP-1 PWB assembly
3) Refer to section 3-4 and remove the cleaner lever.
4) Remove the three screws ①. Taking care not to scratch or soil the tape path surface of the cylinder (drum), lift the cylinder mounting ② slightly, and keeping it raised.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rails (front and rear) of the cylinder mounting ② (grease the parts which come in contact with the S and T incline mounting assembly).
2. Align the two dowels ③ on the mounting cylinder ② with the two holes ④ on the mechanism chassis. Check that connector is inserted in the CP-1 PWB assembly.
3. After assembly, clean the tape path surface of the cylinder (drum).
4. After replacing the cylinder unit, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

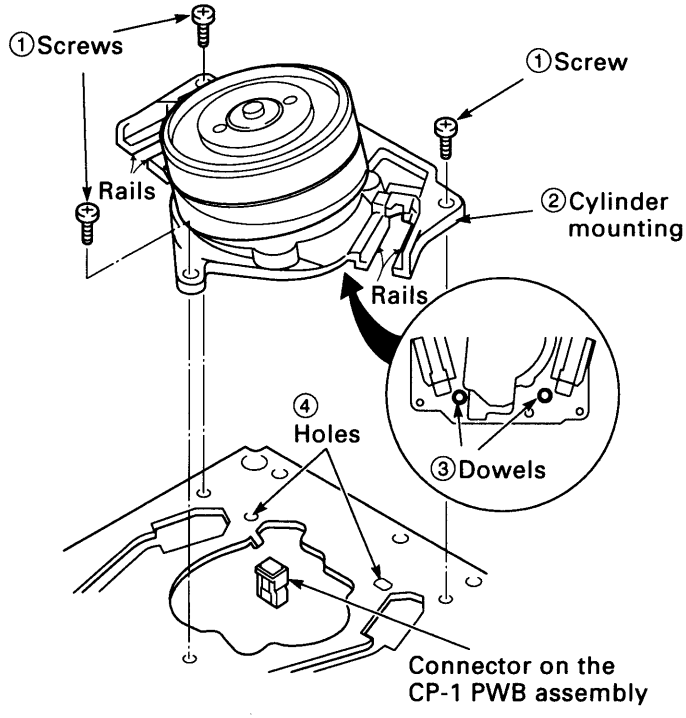


Fig.3-5-5

3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) (See Fig.3-5-6)

1) Refer to section 3-5-2 and remove the cylinder unit.
2) If you have removed the mechanism unit, remove the screw ① and remove the cylinder earth assembly ②.
3) Remove the two screws ③, the rotor ④ and the spacer ⑤.
4) Remove the three screws ⑥ and the stator ⑦.

ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑧ - beside the triangular mark on the rotor ④ - with the hole ⑨ in the rotor disk.
2. When fitting the screws ③ and ⑥, use the torque gauge screwdriver (VHJ-0014). give the screws a tightening torque of 3 kg/cm.
3. Align the dowels ⑩ on the cylinder earth assembly ② with the holes ⑪ in the chassis.
4. If you have removed the cylinder unit, after assembly, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

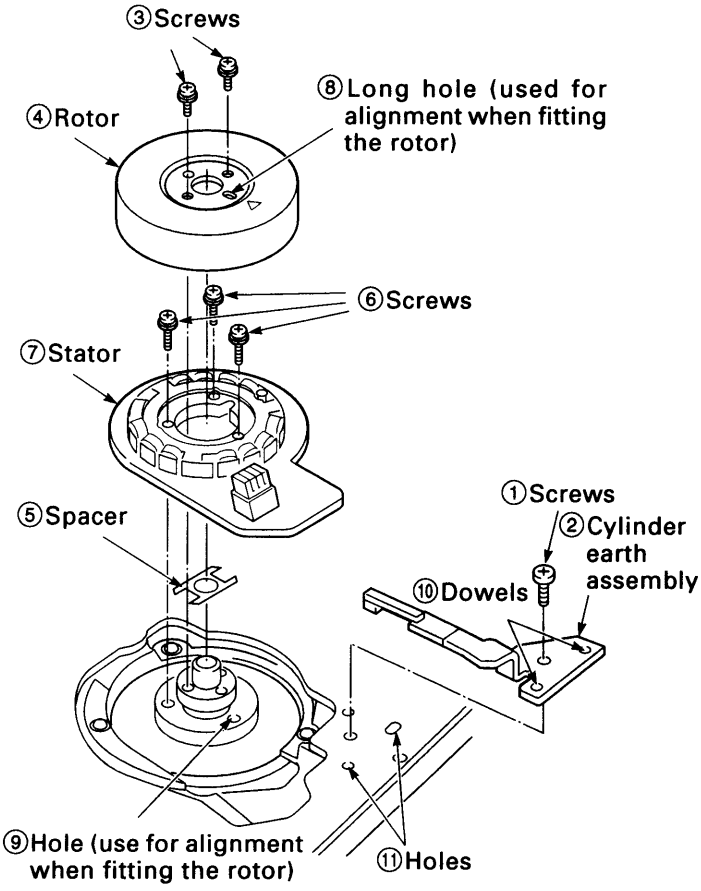


Fig.3-5-6

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

1) Refer to sections 3-5-2 and 3-5-3, and remove the cylinder unit, the rotor, and the stator.
2) Remove the three screws ① and the cylinder assembly ②.

ASSEMBLY NOTES:

1. Be careful not to scratch or soil the top of the cylinder. After fitting the cylinder, clean the surface.
2. Align the cylinder assembly ② with the two dowels ④ on the cylinder mounting ③.
3. After fitting the cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the switching position adjustment of the servo circuit.

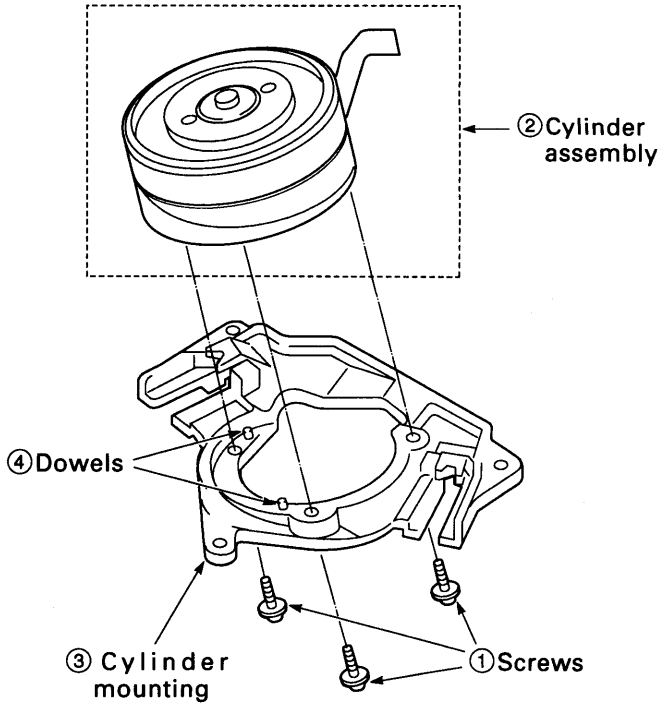


Fig.3-5-7

3-6. FE HEAD AND ACE HEAD

3-6-1. AUDIO R/P HEAD ASSEMBLY (ACE HEAD) (See Fig.3-6-1)

1) Unplug the connector from the audio R/P head assembly (ACE head).
2) Remove the two screws ①, then remove the audio R/P head assembly (ACE head) ②and the washer ③.

ASSEMBLY NOTES:

1. Align the hole ④ on the audio R/P head assembly (ACE head) with the pin ⑤ on the chassis unit.
2. After assembly, check that the clamp ⑥ on the cleaner roller assembly has snapped into the mounting of the audio R/P head assembly (ACE head) ②.
3. After assembly, clean the surface of the head with a soft cloth or chamois.
4. After assembly, refer to section 4-3, and adjust the head height, the azimuth and the tracking (X) position.

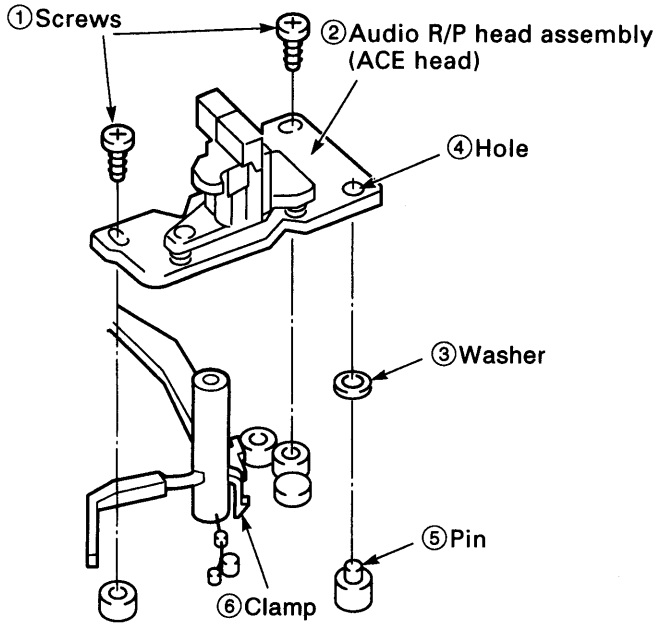


Fig.3-6-1

3-6-2. FULL ERASE HEAD (See Fig.3-6-2)

1) Unplug the connector from the full erase head ①.
2) Remove the screw ② and the full erase head ①.

ASSEMBLY NOTE:

1. After assembly, clean the full erase head ①.

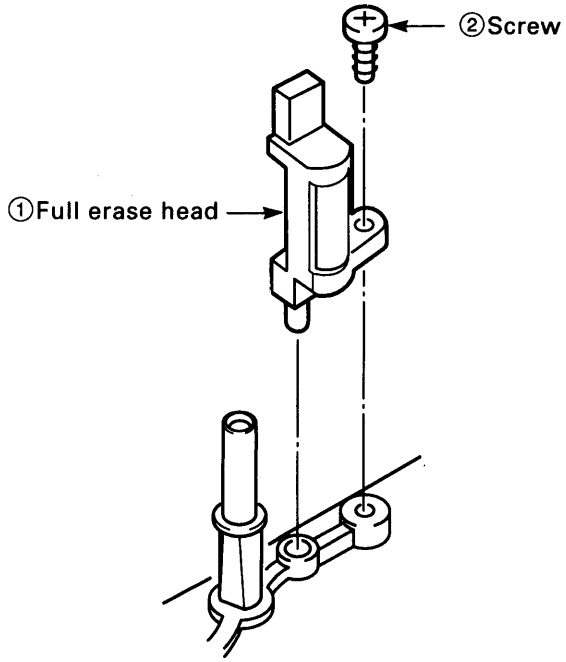


Fig.3-6-2

3-7. CAPSTAN MOTOR

3-7-1. CAPSTAN MOTOR (See Fig.3-7-1)

1) Refer to section 3-2, then remove the mechanism unit.
2) Remove the screw ①, then remove the capstan mounting ②.
3) Remove the reel belt ③.
4) Remove the three screws ④ and the capstan motor ⑤.

ASSEMBLY NOTES:

1. Check that connector ⑥ is inserted in the CP-1 PWB assembly.
2. When fitting the three screws ④, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3.5 kg/cm.
3. After assembly, clean the capstan shaft with a soft cloth or chamois.

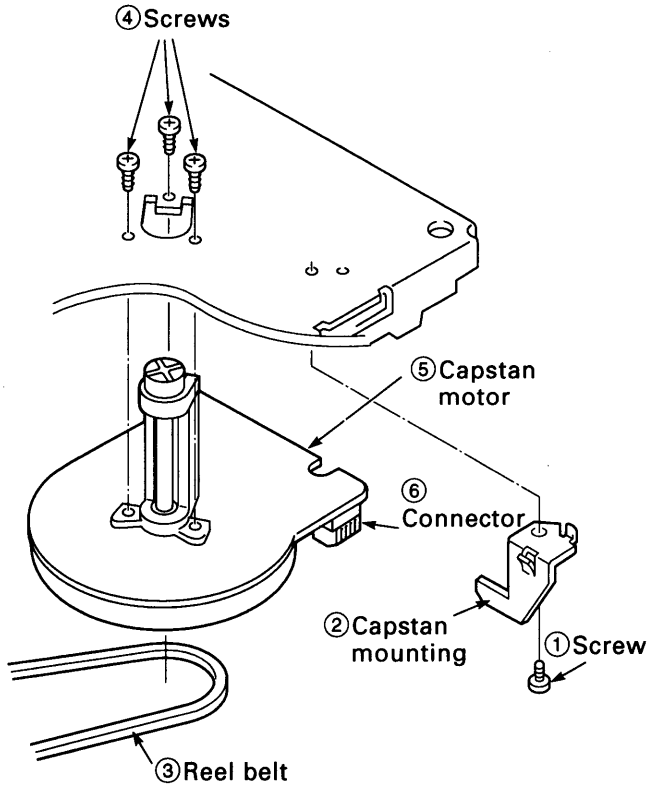


Fig. 3-7-1

3-7-2. CAPSTAN BRAKE ASSEMBLY (See Fig.3-7-2)

1) Remove the spring ①.
2) Remove the clamp ②, then remove the capstan brake assembly ③.

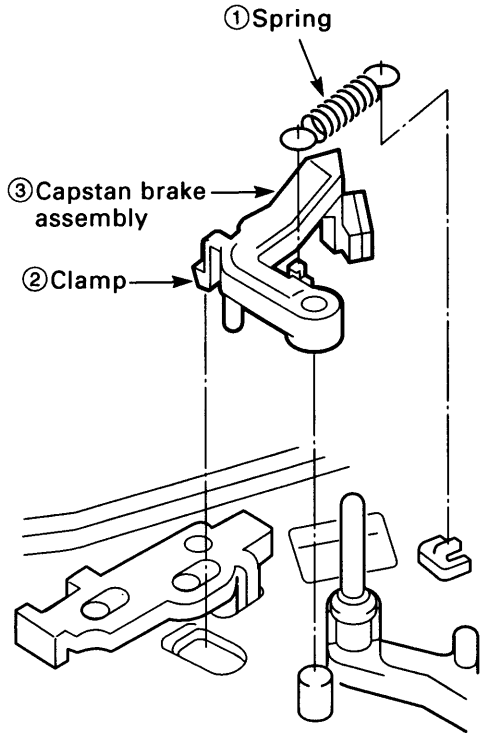


Fig.3-7-2

3-8. LOADING MOTOR ASSEMBLY AND WORM GEAR ASSEMBLY (See Fig.3-8-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the soldering on the lead wires ② of the loading motor assembly from the MC-1 PWB assembly. When you do this, be careful not to let the soldering iron touch any other parts.
3) Press the clamp ③, and remove the loading motor assembly ① and the damper ④. Be careful not to exert too much force on the clamp ③.
4) Remove the worm gear assembly ⑤. To maintain performance, do not dis-assemble the worm gear assembly ⑤.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0010) to the teeth of the worm gear assembly.
2. Check that the clamps ③ and ⑥ are securing the loading motor assembly.
3. Check the polarity of the lead wires ② (the orange wire is the positive terminal, and the gray wire is the negative terminal). After soldering the lead wires ②, adjust them so that they do not touch the friction gear assembly.

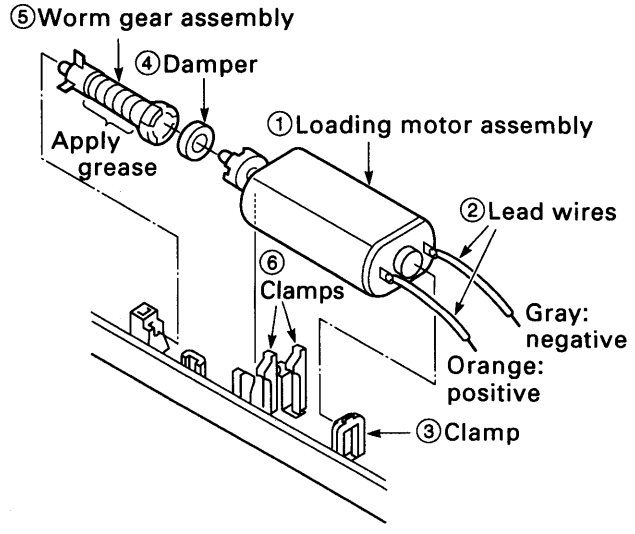


Fig.3-8-1

3-9. PINCH ROLLER PRESSURE MECHANISM

3-9-1. PINCH ROLLER LEVER ASSEMBLY (See Fig.3-9-1)

1) Remove the clamp ①, then remove the pinch lift mounting ②.
2) Remove the spring ③, then remove the pinch roller lever assembly ④ off the pinch lift mounting ②. Before you do this, align the Indentation ⑤ on the pinch roller lever assembly ④ with the clamp ⑥ on the pinch lift mounting ②.

ASSEMBLY NOTE:

1. Be careful to keep the surface of the pinch roller free of dust and dirt.

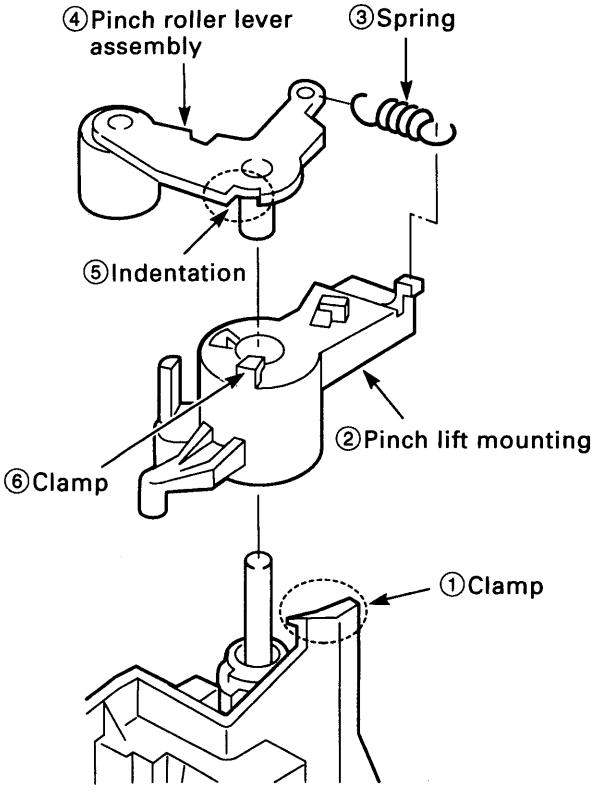


Fig.3-9-1

3-9-2. PINCH LIFT CAM AND PINCH CAM GEAR (See Figs.3-9-2 and 3-9-3)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-9-1 and remove the pinch roller lever assembly.
3) After removing the screw ①, undo the three clamps ②, then remove the opener mounting ③.
4) Remove the clamp ④ and the pinch lift cam ⑤.
5) Remove the pinch cam gear ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) around the shaft ⑦, all over the teeth Ⓑ of the pinch cam gear ⑥, all over the teeth of the pinch lift cam ⑤, all over the cam grooves Ⓐ, and all over the "V Part Ⓒ" of the opener mounting ③. Apply grease (VHJ-0101) to the outside of the shaft ⑧ and all over the top cam Ⓓ of the pinch cam gear ⑥.
2. Check that the positioning mark ⑩ on the mode switch ⑨ is aligned with the arrow ⑪ on the MC-1 PWB assembly, as shown in Fig.3-9-3. Then align the triangular mark ⑫ on the pinch cam gear ⑥ with the arrow ⑪ on the MC-1 PWB assembly. After that, align the round hole ⑬ on the pinch lift cam ⑤ with the indentation ⑭ on the pinch cam gear ⑥.
   If you have carried out the above alignments and the pinch roller will still not move up and down or perform the pressing movement correctly, refer to section 3-15 and check the alignment of the gear wheels 1 and 2, the main cam, and the mode switch.

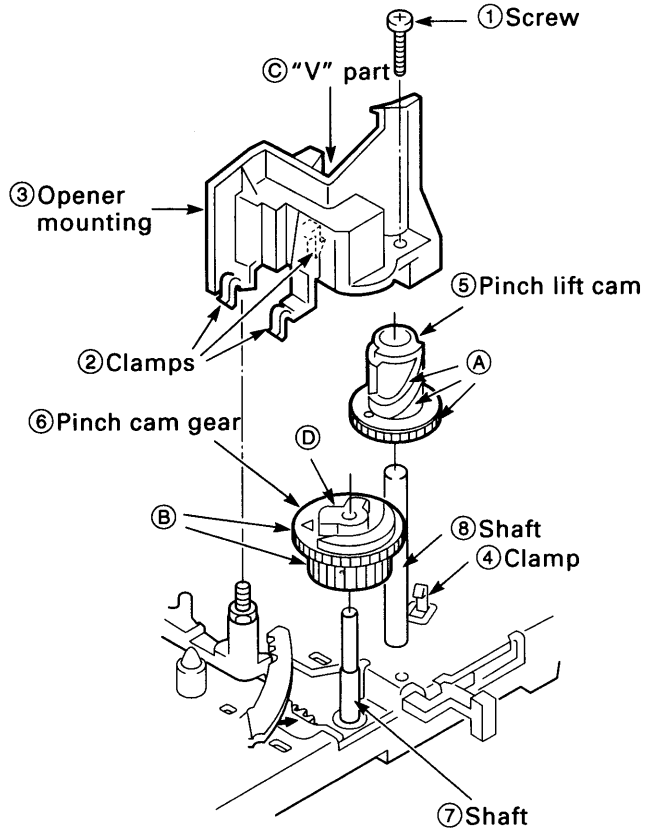


Fig.3-9-2

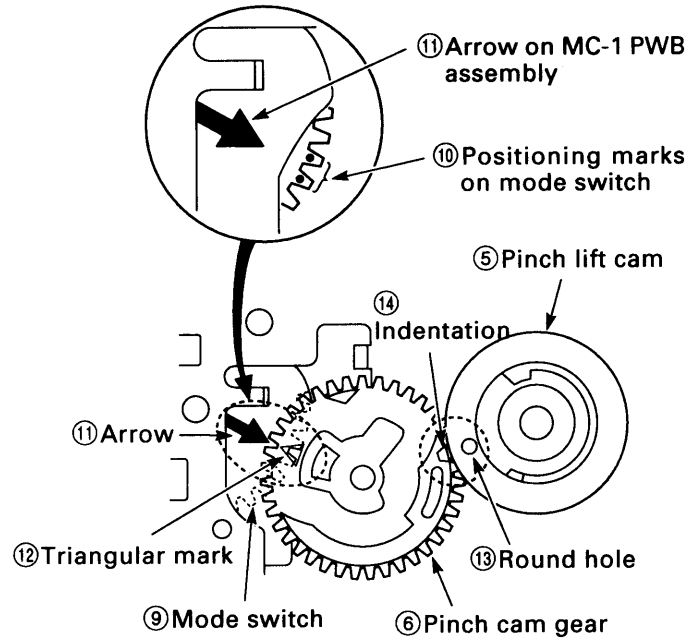


Fig.3-9-3

3-10. L GUIDE ACT LEVER ASSEMBLY, LOAD LEVER ASSEMBLY AND STOPPER LEVER ASSEMBLY (See Fig.3-10-1)

1) Refer to section 3-3 and remove the cassette mechanism assembly.
2) Refer to sections 3-9-1 and 3-9-2 ,then remove the pinch roller lever assembly and the opener mounting.
3) Remove the stopper spring ①.
4) After removing the washer ②, remove the L guide act spring ③ and the L guide act lever assembly ④.
5) Remove the special nut ⑤, then remove the load lever assembly ⑥ and the L guide lever spring ⑦.
6) Remove the stopper lever assembly ⑧.

ASSEMBLY NOTES:

1) Apply grease (VHJ-0100) to the toothed area Ⓐ of the L guide act lever assembly ④ and around the shafts ⑨ and ⑩.
2) Refer to section 4-3 and adjust the height of the load lever assembly.
3) Hook the L guide lever spring ⑦ into the stopper ⑪ and the load lever assembly ⑥ shown in Fig. A.
4) Put the pin ⑫ of the L guide act lever assembly into the cam groove ⑬ of the crescent slide.

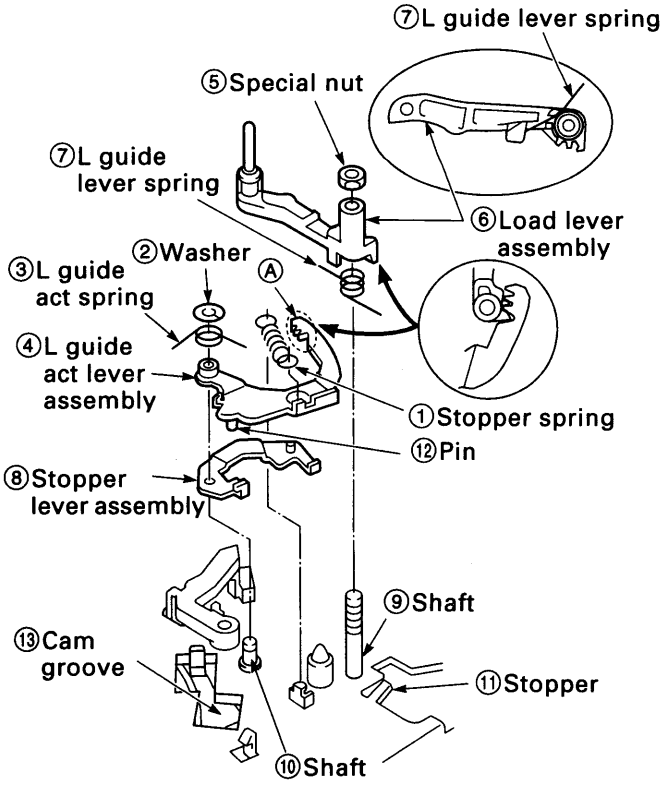


Fig.3-10-1

3-11. BT LEVER ASSEMBLY (See Fig.3-11-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the BT spring ①, and remove the sub BT spring ② on the underside of mechanism chassis.
4) Remove the clamp ③ on the underside of the mechanism chassis, then remove the BT lever assembly ④.
5) Remove the clamp ⑤ on the band brake assembly ⑥. Then, as shown in Fig. A, align the other end of the band brake assembly with the protruding parts of the BT lever assembly ④ before removing it.

ASSEMBLY NOTES:

1. When fitting the BT lever assembly ④, be careful not to bend the stopper ⑦ or the S incline mounting assembly ⑧ out of shape by knocking it against them.
2. Hook the long hook of the BT spring ① into the BT lever assembly ④, as shown in Fig. B.
4. After assembly, make sure that the mountings on both ends of the band brake assembly ⑥ are positioned as shown in Fig. C.
5. After assembly, refer to section 4-2-1, and make the appropriate adjustment.

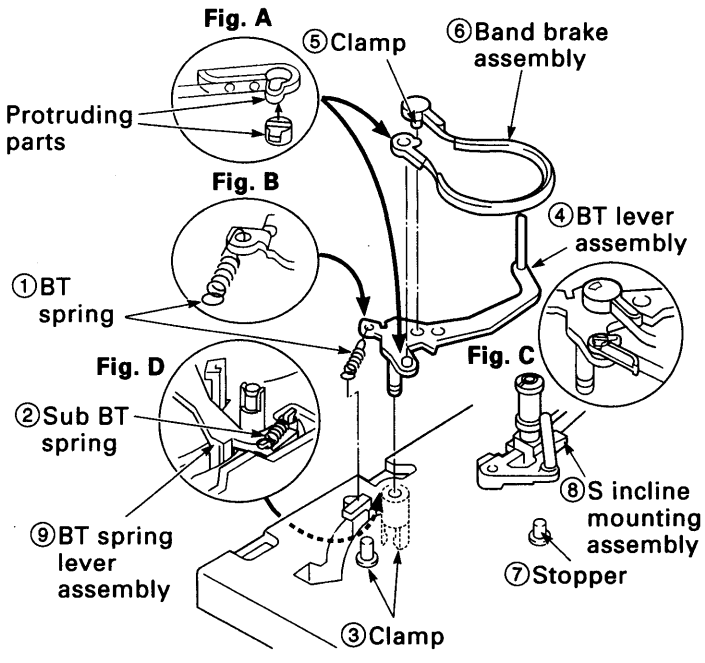


Fig.3-11-1

3-12. REEL DRIVE MECHANISM

3-12-1. REEL BELT, REEL PULLEY, FRICTION GEAR ASSEMBLY AND CLUTCH CHANGE LEVER (See Fig.3-12-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the reel belt ① from the reel pulley ②.
3) Take off the washer ③ and remove the reel pulley ②.
4) Take off the washer ④ and remove the friction gear assembly ⑤.
5) Remove the clutch change spring ⑥.
6) remove the clamp ⑦ gripping the top of the mechanism chassis, then remove the clutch change lever ⑧.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑨ and ⑩, apply a drop of oil (VHJ-0099) to each.
2. Be careful not to get any grease on the reel belt ①.

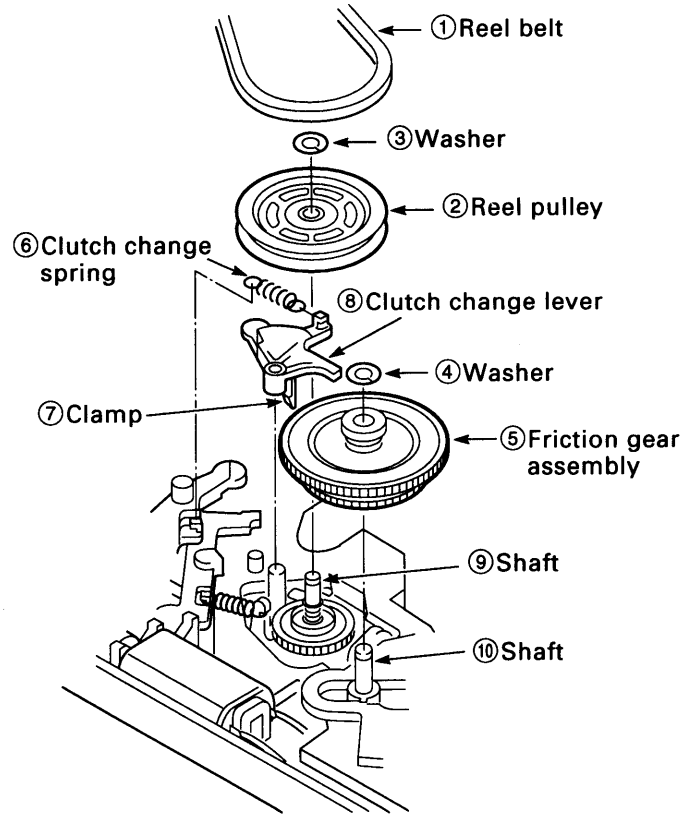


Fig.3-12-1

3-12-2. CLUTCH MOUNTING ASSEMBLY (See Fig.3-12-2)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Refer to section 3-12-1 and remove the reel pulley.
3) Remove the two screws ①, then remove the clutch mounting assembly ②.

ASSEMBLY NOTES:

1. Align the two holes ③ with the shafts ④ and ⑤. Be careful not to press part A of the clutch mounting assembly ② against the band brake assembly.
2. After assembly, make sure that the clamp on the clutch change lever has snapped into the chassis.

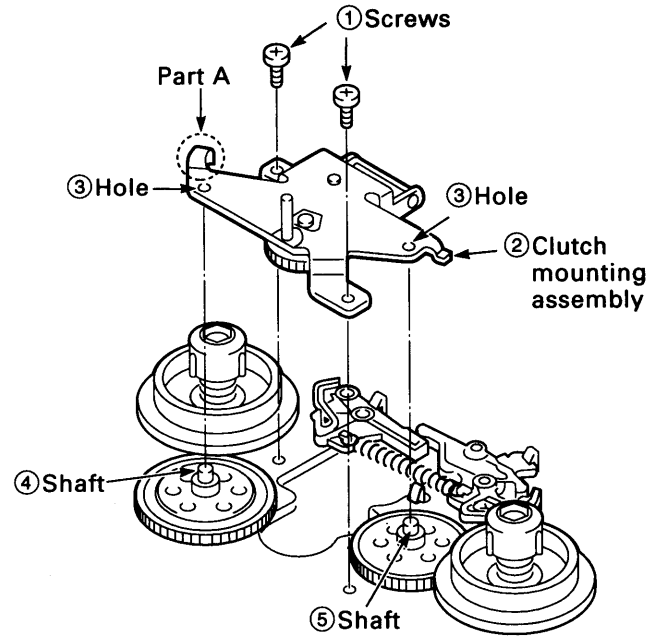


Fig.3-12-2

3-12-3. S SOFT LEVER, SUPPLY REEL ASSEMBLY AND S REEL GEAR (See Fig.3-12-3)

1) Remove the S soft spring ①.
2) Remove the clamp ②, then remove the S soft lever ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Refer to section 3-11 and remove the band brake assembly, then remove the supply reel assembly ④ and the S reel gear ⑤.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑥ and ⑦, apply a drop of oil (VHJ-0099) to each.
2. After assembly, clean the side of the supply reel assembly ④.

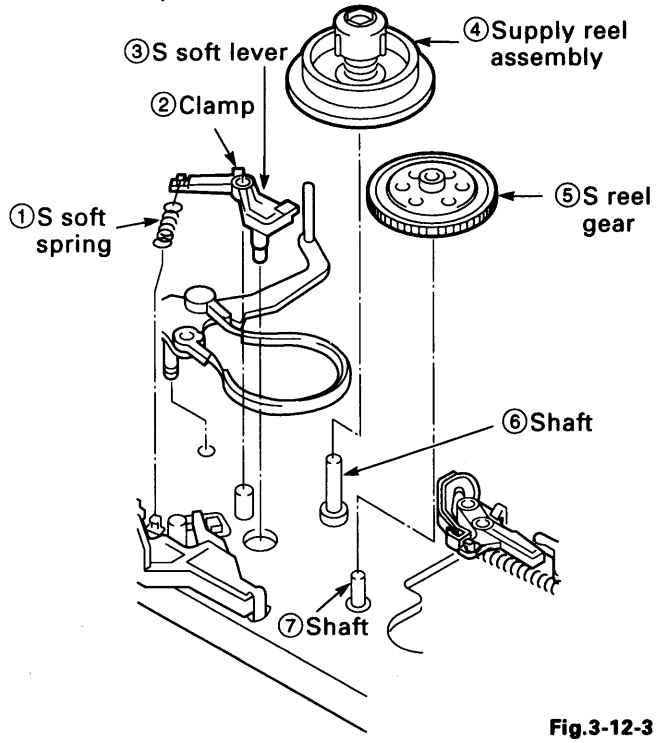


Fig.3-12-3

3-12-4.T SOFT BRAKE ASSEMBLY, TAKE UP REEL ASSEMBLY, T REEL GEAR (See Fig.3-12-4)

1) Remove the T soft spring ①.
2) Remove the clamp ② , then remove the T soft brake assembly ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Pressing the T brake assembly ④ in the direction of the arrow, remove the take up reel assembly ⑤ and the T reel gear ⑥.

ASSEMBLY NOTE:

1. After cleaning the shafts ⑦ and ⑧, apply a drop of oil (VHJ-0099) to each.

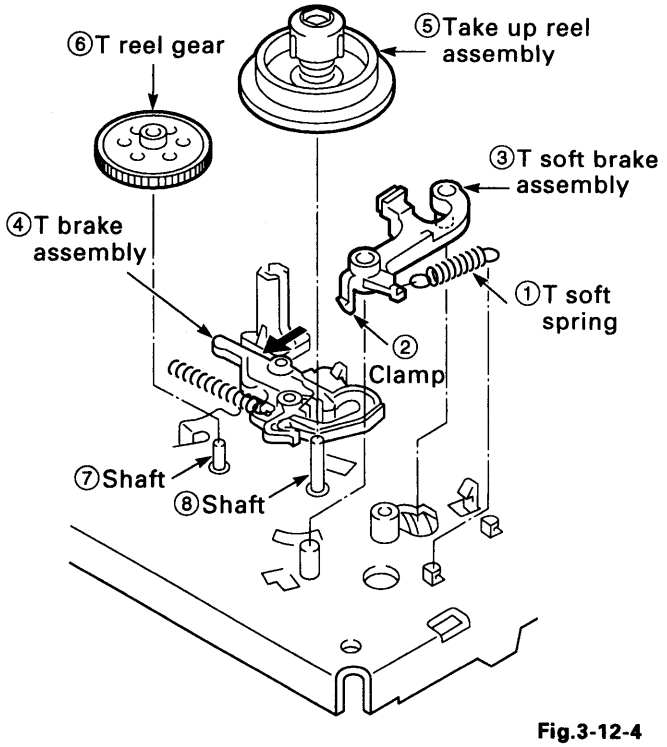


Fig.3-12-4

3-13. BRAKES

3-13-1.S BRAKE ASSEMBLY, T BRAKE ASSEMBLY, T BRAKE ACT SLIDE (See Fig.3-13-1)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the two clamps ①, then remove the T brake act slide ②. (Note: You can remove the S brake assembly ⑦ and the T brake assembly ⑤ without removing the T brake act slide ②.)
3) Remove the brake spring ③.
4) Remove the two clamps ④ simultaneously, then remove the T brake assembly ⑤.
5) Remove the clamp ⑥, then remove the S brake assembly ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧ and ⑨.
2. When fitting the T brake act slide ②, align the mark ⑩ with the shaft ⑪.

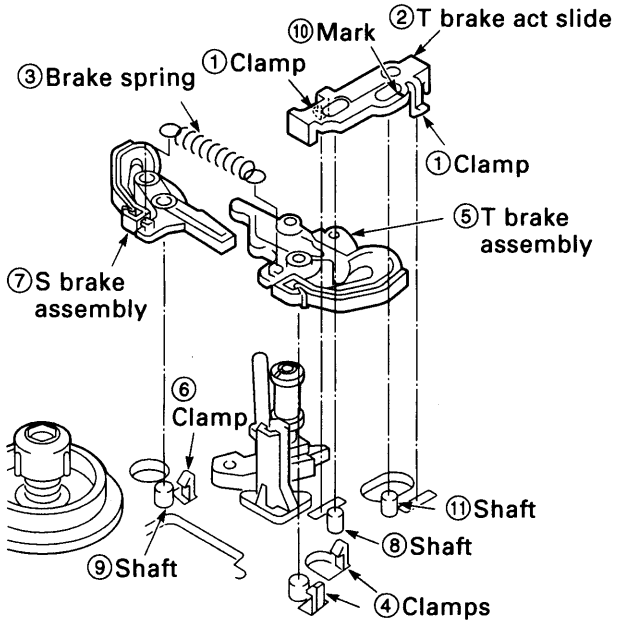


Fig.3-13-1

3-13-2. BRAKE CONTROL LEVER AND BRAKE ACT LEVER ASSEMBLY (See Fig.3-13-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) Refer to sections 3-12-1, then remove the reel belt and the reel pulley.
4) Remove the clamp ①, then remove the wheel gear 1 ②.
5) Remove the clutch change spring ③.
6) Remove the clamps ④ and ⑤, then remove the brake control lever ⑥. Remove the clamp ④ on the topside of the mechanism chassis.
7) Remove the brake return spring ⑦.
8) Refer to section 3-8 and remove the worm gear assembly.
9) Remove the clamp ⑧ and clamp ⑤, then remove the brake act lever assembly ⑨. To maintain the performance of the brake act lever assembly ⑨, do not disassemble it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑩ and ⑪, to the teeth of the wheel gear 1 ②, and to the pin ⑫ of the brake control lever ⑥.
2. Put the pin ⑫ of the brake control lever ⑥ into the cam groove ⑭ of the crescent slide.
3. Before fitting the wheel gear 1 ②, align the hole ⑮ with the hole ⑯ on the mechanism chassis.
4. Refer to section 3-15 and align the wheel gear 2.

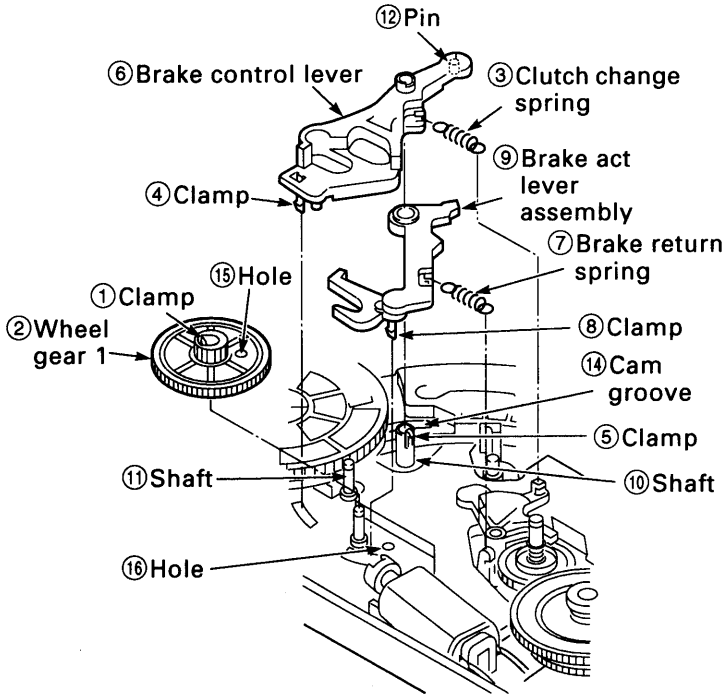


Fig.3-13-2

3-13-3. S BRAKE ACT SLIDE AND BT SPRING LEVER ASSEMBLY (See Figs.3-13-3 and 3-13-4)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-12-1 and remove the friction gear assembly.
3) Slide the S brake act slide ① in the direction of the arrow Ⓐ, then remove it.
4) Refer to section 3-11 and remove the BT spring.
5) Remove the sub BT spring ②.
6) Press the BT spring lever assembly ③ until it touches the pin ④, then remove it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shaft ⑤ shown in Fig. 3-13-3, and to the BT spring lever assembly ③ and the S brake act slide ① shown in Fig.3-13-4.
2. After mounting the BT spring lever assembly ③ on the Shaft ⑤, hook the BT spring onto the clamp ⑥ and press it until it touches the pin ⑦.
3. Make sure that the clamps ⑧, ⑨ and ⑩ have snapped into the S brake act slide ①. Align the arrow ⑪ on the S brake act slide ① with the arrow ⑫ on the mechanism chassis.

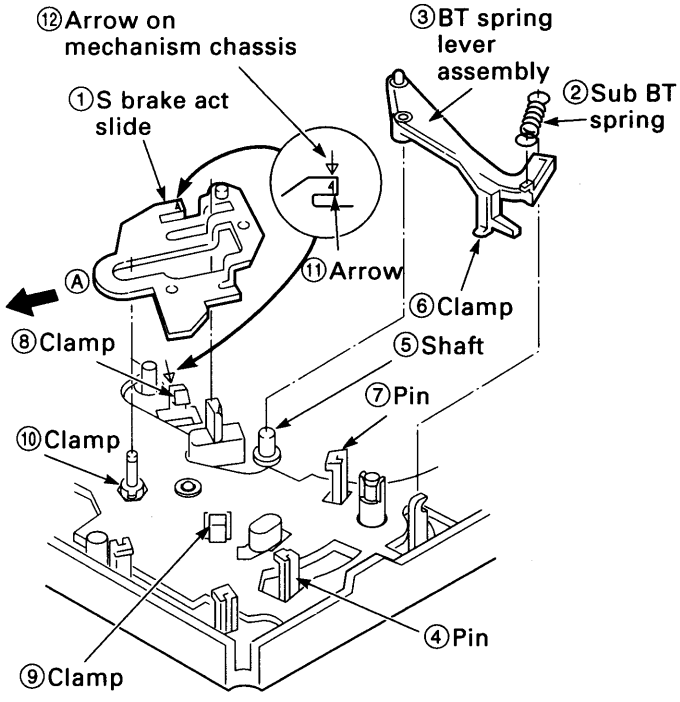


Fig.3-13-3

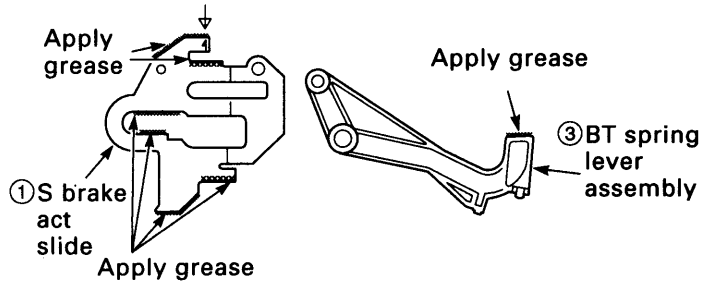


Fig.3-13-4

3-14. GUIDES

3-14-1. GUIDE ROLLER ASSEMBLY (See Fig.3-14-1)

1) Unscrew the two screws ①. When you do this, be careful not to damage the cylinder or the video head.
2) Remove the two guide roller assemblies ② by unscrewing them counterclockwise.

ASSEMBLY NOTES:

1. Tighten the two screws ① to a torque of 600 g/cm. After tightening, apply a screw-locking glue.
2. After replacing the parts, be sure to clean the guide roller and carry out tape path adjustment as described in section 4-3.

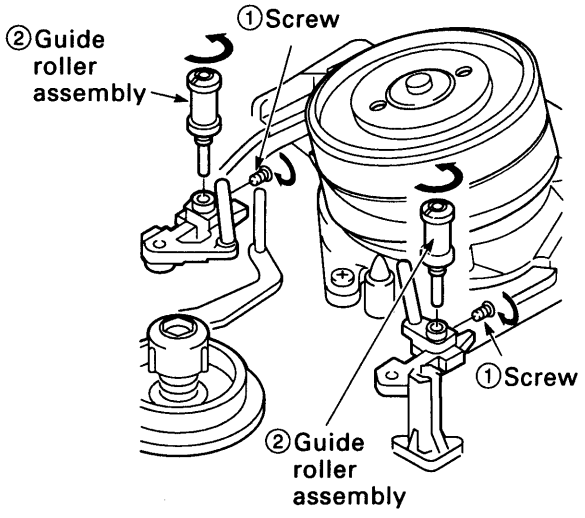


Fig.3-14-1

3-14-2.S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-5-2 and remove the cylinder unit.
3) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
4) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
5) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
3. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

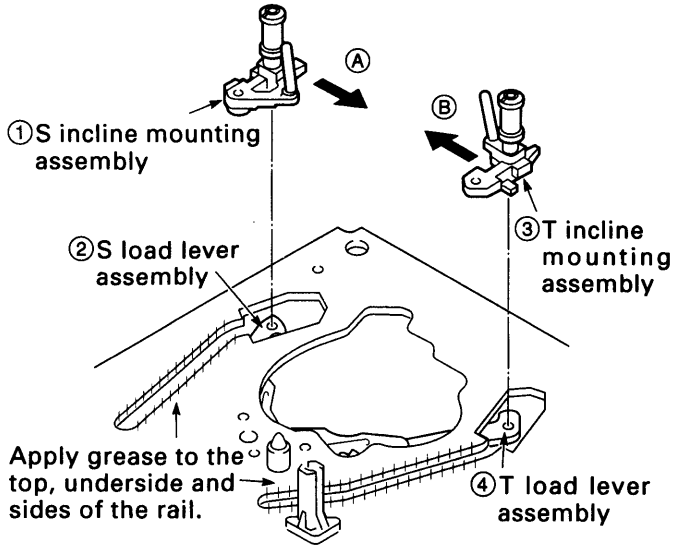


Fig.3-14-2

3-15. WHEEL GEAR 2, MAIN CAM AND MODE SWITCH (See Figs.3-15-1 and 3-15-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-7-1, then remove the harness mounting.
3) Remove the clamp ①, then remove the wheel gear 2 ②.
4) Remove the washer ③, then remove the main cam ④.
5) After unscrewing the screw ⑤, remove the soldering from the terminal of the mode switch ⑥.
6) Remove the clamp ⑦, then remove the mode switch ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and ⑩, to the teeth of the main cam ④, and to the all over the cam groove of main cam ④.
2. When fitting the mode switch ⑥, align it in ⒶⒷ order as shown in Fig.3-15-2. The alignment of the part Ⓑ is shown in Fig. A. Position the teeth of the mode switch ⑥ so that the sixth tooth space left of part Ⓐ is aligned with the triangular mark on the pinch cam gear ⑪. After aligning part Ⓑ, refer to section 3-9-2 and check the positioning of the mode switch, the pinch cam gear and the pinch lift cam.
3. Beforehand, remove the soldering from the soldered part of the MC-1 PWB assembly, in order to prevent the mode switch ⑥ being warped. Solder the mode switch ⑥ after tightening the screw ⑤ (See Fig. 3-15-1).
4. Align the hole in the crescent slide ⑫ with the hole in the mechanism chassis, as shown at point Ⓖ in Fig.3-15-2 (refer to section 3-16 and see the holes ⑤ and ⑥ in Fig.3-16-1).
5. When fitting the main cam ④, position the mode switch ⑥ and the front rack gear ⑬ as shown at points Ⓒ and Ⓓ respectively in Fig.3-15-2.
6. When fitting the gear wheel 2 ②, position the main cam ④ and the wheel gear 1 ⑭ as shown at points Ⓔ and Ⓕ respectively in Fig.3-15-2.

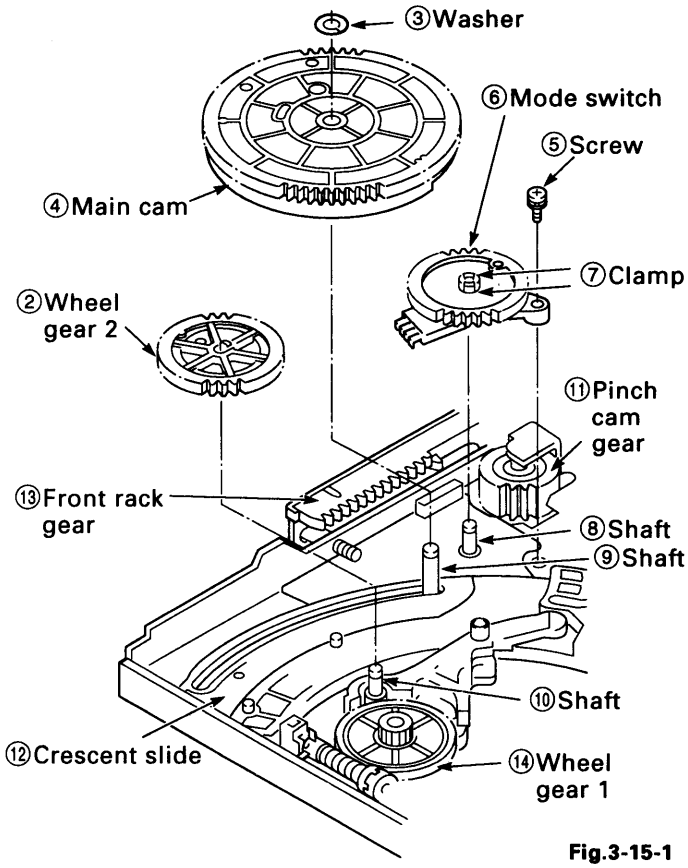


Fig.3-15-1

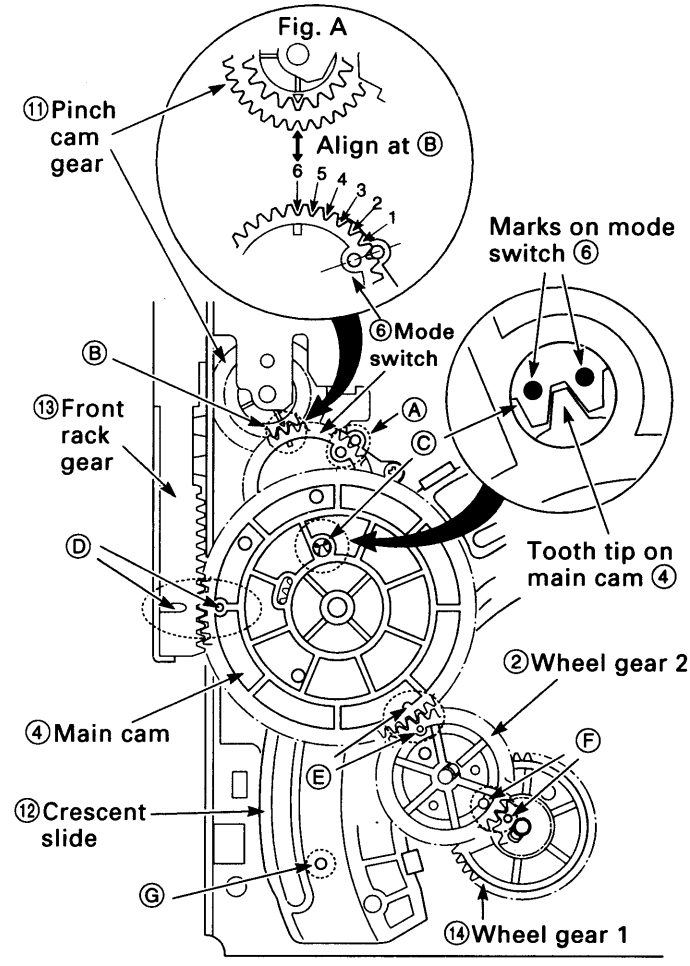


Fig.3-15-2

3-16. CRESCENT SLIDE (See Figs.3-16-1 and 3-16-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Refer to section 3-7-2 and remove the capstan brake assembly.
4) Refer to section 3-12-4 and remove the T soft brake assembly.
5) Refer to section 3-13-1 and remove the T brake act slide.
6) Refer to section 3-12-1, then remove the reel belt and the reel pulley.
7) Refer to section 3-15, then remove the wheel gear 2 and the main cam.
8) Refer to section 3-13-2, then remove the wheel gear 1 and the brake control lever.
9) Remove the two screws ⑪, then remove the crescent mounting ⑫.
10) Remove the clamps ① and ②, then raise the right end of the crescent slide ③ slightly. Slide the crescent slide ③ to the right until it comes away from the clamp ④, then remove it.

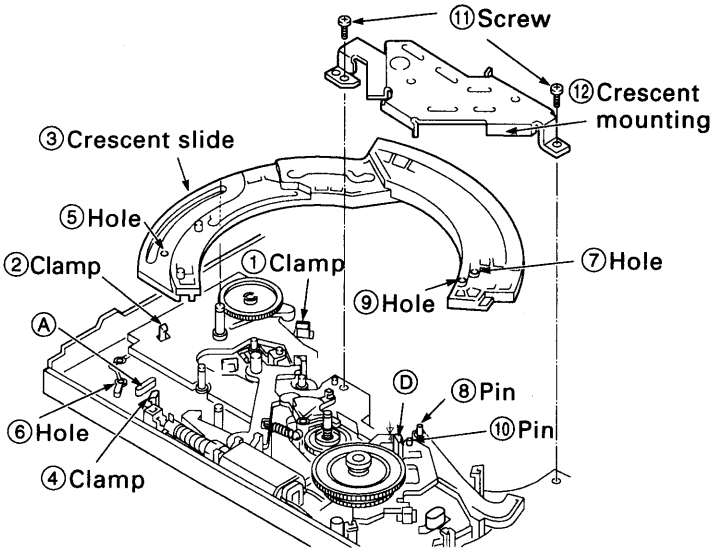


Fig.3-16-1

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the points Ⓐ,Ⓑ,Ⓒ and Ⓓ in Fig.3-16-1, and to the crescent slide ③ shown in Fig.3-16-2.
2. Before fitting the crescent slide ③, refer to section 3-13-3 and align the arrow on the S brake act slide with the arrow on the mechanism chassis. Then refer to Fig.3-17-3 and check that the S load gear and the T load gear have completed tape unloading.
3. When assembling the parts, raise the right side of the crescent slide ③ slightly, and keeping it in this position, slot the left side into the clamp ④, then align the hole ⑤ with the hole ⑥ in the mechanism chassis. When you do this, check that the hole ⑦ is aligned with the pin ⑧ on the BT spring lever assembly, and that the hole ⑨ is aligned with the pin ⑩ on the S brake act slide, before pressing the crescent slide ③ into place. Check that the clamps ①, ② and ④ are engaged.
4. After assembly, check that each lever and each brake is working properly.

Apply grease to the areas shown in ▓▓
• The places marked by dots should be greased particularly generously.

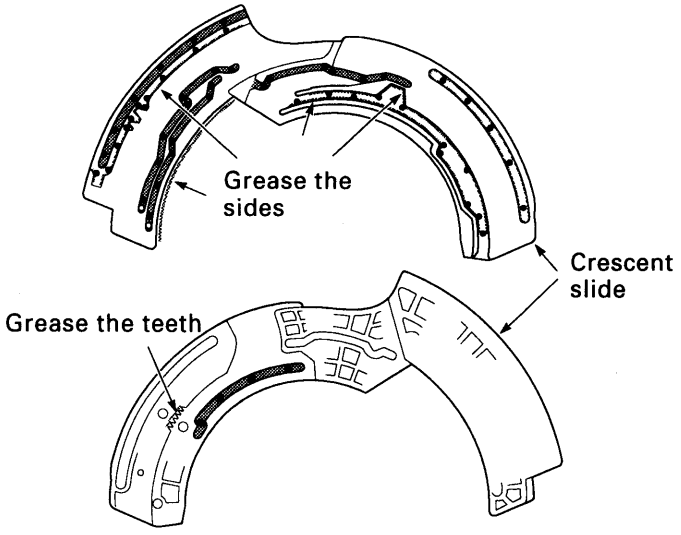


Fig.3-16-2

3-17. S LOAD GEAR, T LOAD GEAR, S LOAD LEVER ASSEMBLY AND T LOAD LEVER ASSEMBLY (See Figs.3-17-1, 3-17-2 and 3-17-3)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-14-2 and remove the S and T incline mounting assemblies.
3) Remove the clamp ①, then remove the components: the S load gear ②, the S load spring ③ and the S load lever assembly ④. When you do this, be careful not to damage the clamp ①, which can be damaged easily. Again, be careful when you disassemble the components, as the S load spring ③ will spring out.
4) Remove the following components: the T load gear ⑤, the T load spring ⑥, and the T load lever assembly ⑦. Be careful when you disassemble the components, as the T load spring ⑥ will spring out.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and parts A shown in Fig.3-17-1. Then apply grease (VHJ-0100) to the parts shown in Fig.3-17-2.
2. When fitting the S load gear ② and the T load gear ⑤ align them in the tape-loaded state, as shown in Fig. A in Fig.3-17-3. Again, after completing tape-unloading on these gears, check that they are positioned as shown in Fig. B in Fig.3-17-3, then refer to section 3-14-2 and fit the S and T incline mounting assemblies.

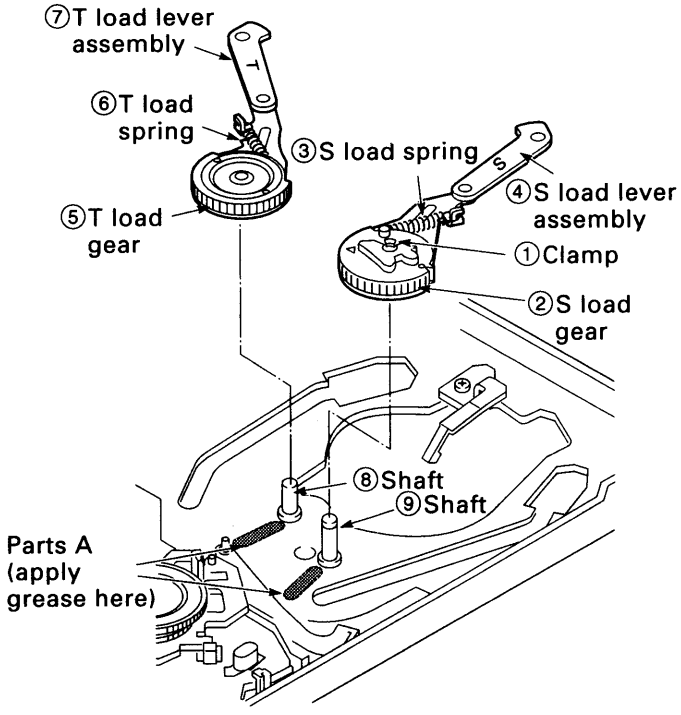
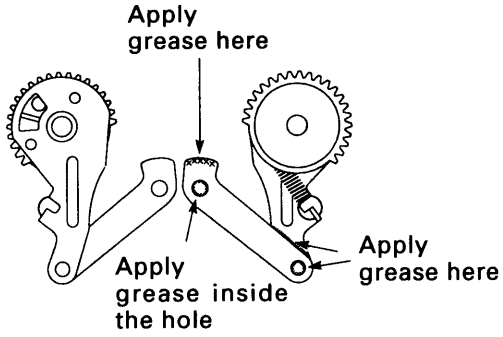


Fig.3-17-1

(T side)



(S side)

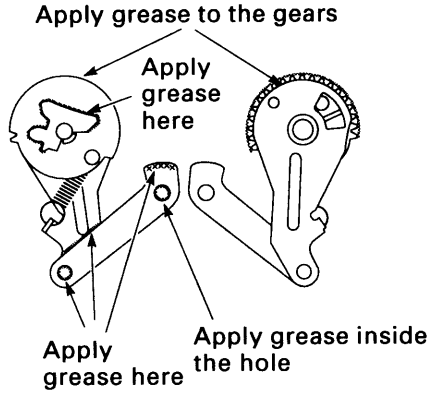


Fig.3-17-2

Fig. A: When tape loading is complete

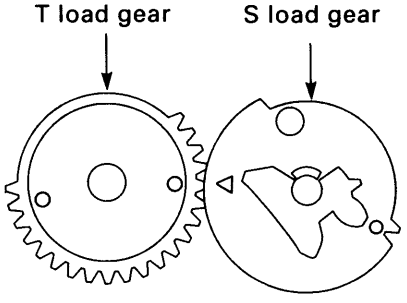


Fig. B: When tape unloading is complete

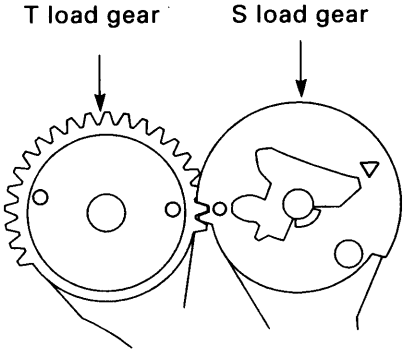


Fig.3-17-3

3-18. TAPE SENSORS, REEL SENSOR AND EP SW LEVER

3-18-1 TAPE TOP SENSOR AND TAPE END SENSOR (See Fig.3-18-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diodes ①, ② and the LED ③. When removing the photo diode ② on the tape top sensor side, refer to section 3-15 and remove the main cam.

ASSEMBLY NOTES:

1. Fit the photo diodes ① and ② so that their photo-receptors to face the LED ③, as shown in Fig.3-18-1. Align the cuts in the LED ③ and the holder ④. Push the photo diodes ①, ② and the LED ③ as far down as they will go, so that they do not protrude above the top of their holders.
2. Do the soldering quickly.

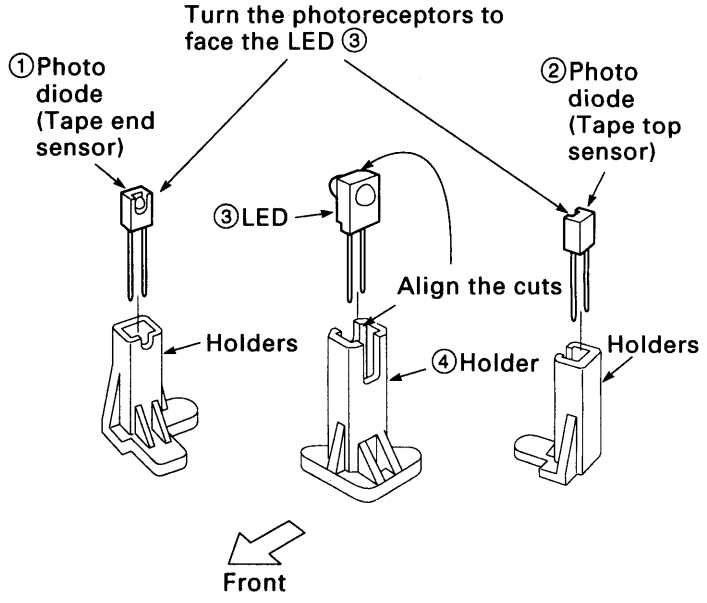


Fig.3-18-1

3-18-2. REEL SENSOR (See Fig.3-18-2)

1) Refer to sections 3-12-2 and 3-12-4, then remove the clutch mounting assembly, the T soft brake assembly and the take up reel assembly.
2) Refer to section 3-13-2, then remove the wheel gear 2, the wheel gear 1, and the brake control lever.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diodé (reel sensor) ①.

ASSEMBLY NOTES:

1. When assembling the parts, align the cut on the photo diode (reel sensor) ① with the protrusion on the mechanism chassis ②.
2. Do the soldering quickly.

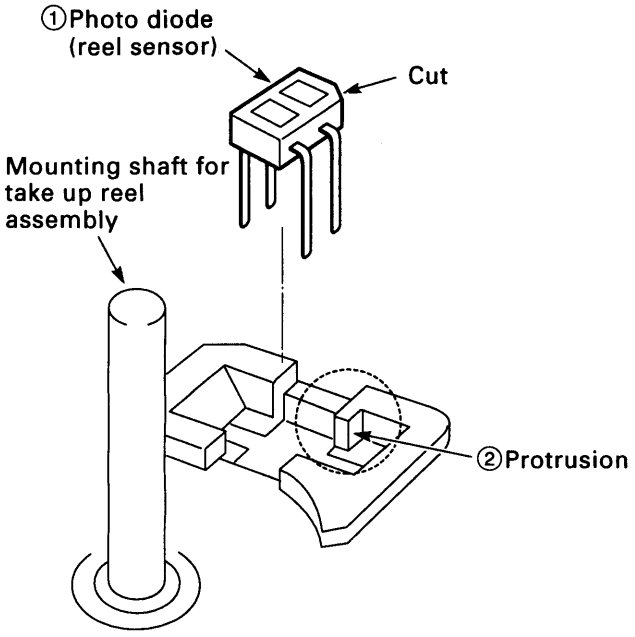


Fig.3-18-2

3-18-3.EP SWITCH LEVER (See Fig.3-18-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the EP switch spring ①.
3) Remove the clamp ②, then remove the EP switch lever ③.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the protrusion ④ on the back of the EP switch lever ③.
2. After fitting the cassette mechanism assembly, check that in EJECT mode, the EP switch lever ③ does not touch the EP switch ⑤.

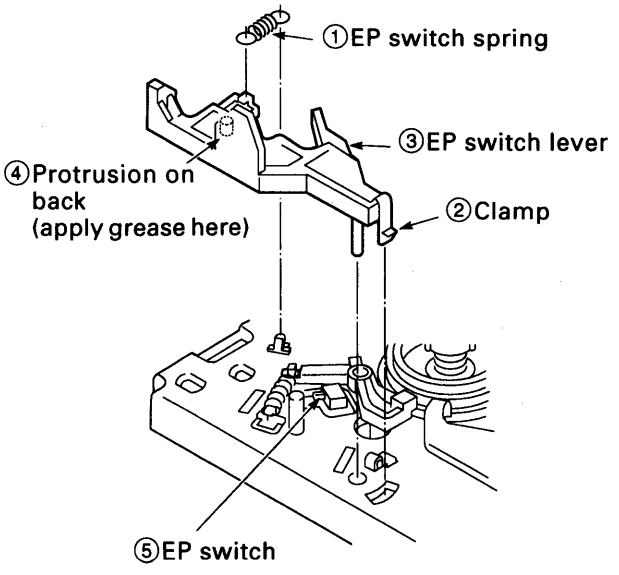


Fig.3-18-3

4. MECHANISM CHECKS AND ADJUSTMENTS

4-1. REEL TABLE TORQUE CHECK

1)With the power switch turned OFF, stick black vinyl tape over the photo diodes of the tape sensors. Then turn the power switch ON. Front loading will begin. Refer to section 3-2 and Fig.3-2-2, and release the locks of the tray lock lever and the lid opener lever.

NOTES:

1. The measurements must be taken without any incandescent light or daylight.

2. If the mechanism cannot be put into PLAY, FF or REW mode by the method described in 1) above, make a dummy cassette tape, as shown in Fig.4-1-2. The dummy cassette tape is made as follows: Unscrew the five screws on the underside, remove the reels, leaf springs and other parts on the supply and take up sides, make holes in the upper surface as wide as the reel diameter, then assemble the parts.

2) Put the mechanism into REW mode, wait at least 10 seconds, then measure the torque value of the reel table on the supply side. It should be at least 600 g/cm.
   Take the measurement with the torque dial gauge (VHJ-0004) held in position in your hand (lock torque). While taking the measurement, rotate the reel table (take up reel assembly) on the take up side with your hand so that the reel sensor does not respond.

3) After switching to FF mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be at least 600g/cm (lock torque).

4) After switching to PLAY mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be between 55 and 110g/cm (lock torque).

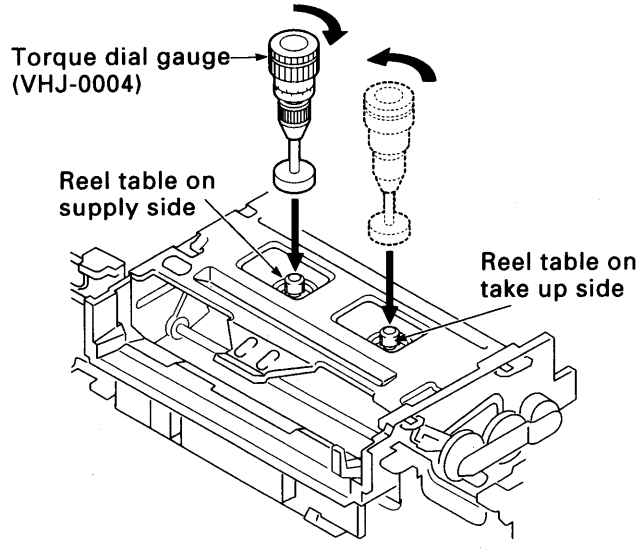


Fig.4-1-1

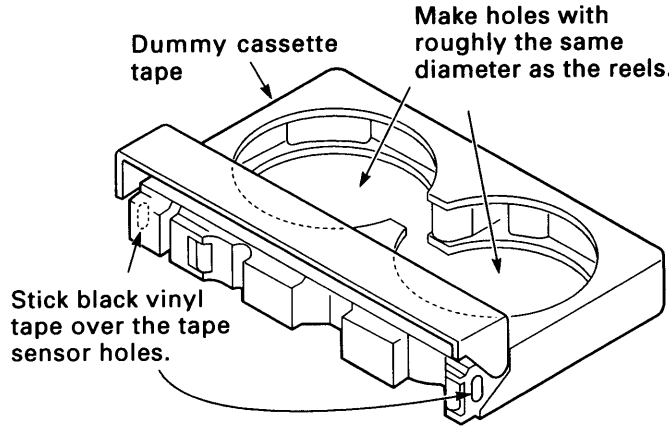


Fig.4-1-2

4-2. ADJUSTING THE BT LEVER ASSEMBLY POSITION AND CHECKING THE BACK TENSION TORQUE IN PLAY MODE

4-2-1. BT LEVER POLE POSITION ADJUSTMENT (See Fig.4-2-1)

1) Without loading a cassette tape, put the mechanism into PLAY mode (turn the power switch OFF).

2) Adjust point Ⓐ on the band brake assembly by rotating it so that the tip of the BT lever assembly is aligned with the line on the left side of the mechanism chassis.

3) Refer to section 4-2-2 and check that the back tension torque is between 30 and 50g/cm.

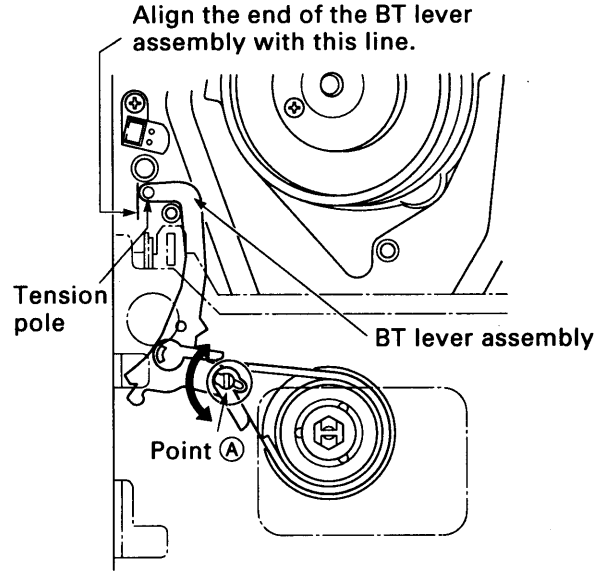


Fig.4-2-1

4-2-2. CHECKING THE BACK TENSION TORQUE PLAY MODE

1) Mount the cassette torque meter (VHJ-0016) and switch to PLAY mode.

2) Check that the back tension torque is between 30 and 50g/cm.

4-3. TAPE PATH ADJUSTMENT

In normal circumstances, the tape path system does not need to be adjusted. However, after removing or replacing one of the parts shown in Fig.4-3-1, you should check and adjust the tape path. The adjustment of the tape path is carried out while monitoring the envelope waveform of the video head output, using an oscilloscope. To make sure that the tape drawn off the reel runs freely and without excessive tension along all the tape guides and cylinders (drums), it is also important to check each tape guide by eye.

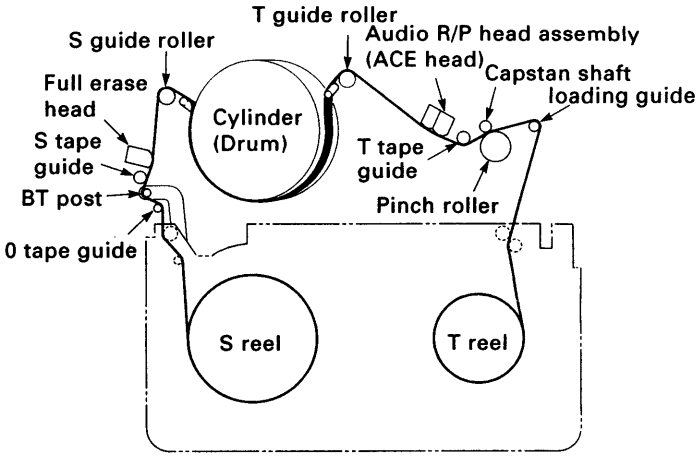


Fig.4-3-1

4-3-1. ADJUSTMENT PROCEDURE

1. Select a PAL or NTSC alignment tape or blank cassette tape, according to the transmission system of the VCR you are repairing.

NTSC: For models with 525 scanning lines and a field frequency of 60Hz
PAL: For models with 625 scanning lnes and a field frequency of 50Hz

2. Clean the tape guides, the cylinder (drum), the capstan Shaft, the audio R/P head (ACE head) and the full erase head.
3. Using an oscilloscope, adjust the height of the guide roller and carry out horizontal position adjustment,height adjustment and azimuth adjustment on the audio R/P head (ACE head). When observing the envelope waveform, bring the CH-1 probe into contact with the envelope waveform test point, and bring the CH-2 probe into contact with the switching pulse (SW P) test point. While adjusting the tape path, set the trigger at the low side of the switching pulse (SW P) in order to observe the output waveform on the CH-1 side of the video head.

NOTE: The contact point for the oscilloscope varies from one model to another, so to find the correct point for your model, refer to the figure entitled "Test point for tape path adjustment" in the electrical circuit section of the service manual.

4. When checking the tape path by eye, use a dental mirror.

4-3-2. LOAD LEVER ASSEMBLY HEIGHT ADJUSTMENT (See Fig.4-3-2)

1. Refer to sections 3-9-2, and remove the opener mounting .
2. Position the height adjustment tool (VHJ-0111) ③ under the full surface of the protrusion ② on the load lever assembly ①, as shown in Fig.4-3-2.
3. Using your fingers, gently screw the adjustment nut ④ clockwise into the nut box (VHJ-0048) ⑤ until the protrusion ② of the load lever assembly ① touches the height adjustment tool (VHJ-0111) ③ and the screw starts to feel tight. Next, loosen the adjustment nut ④ by 270° counterclockwise.
4. Load a cassette tape (NTSC: T-160, PAL: E-240). Wind the tape to the beginning, and repeat FF⟷REV five times (repeat for the same portion 30 to 60 seconds). If the bottom edge of the tape breaks, rotate the adjustment nut ④ in the counterclockwise direction by about 90°. Repeat FF ⟷REV five times again and check that the tape edge does not break (adjust again if it does). Next, repeat CUE⟷REV five times and check that the tape is not damaged. If damaged, rotate the adjustment nut in the clockwise direction by about 90°. Repeat FF⟷REW and CUE⟷REV and check that the tape is not damaged.

Arrange the equipment so that the whole surface of the projection on the load lever assembly is positioned over the height adjustment tool (VHJ-0111) when seen from directly overhead.

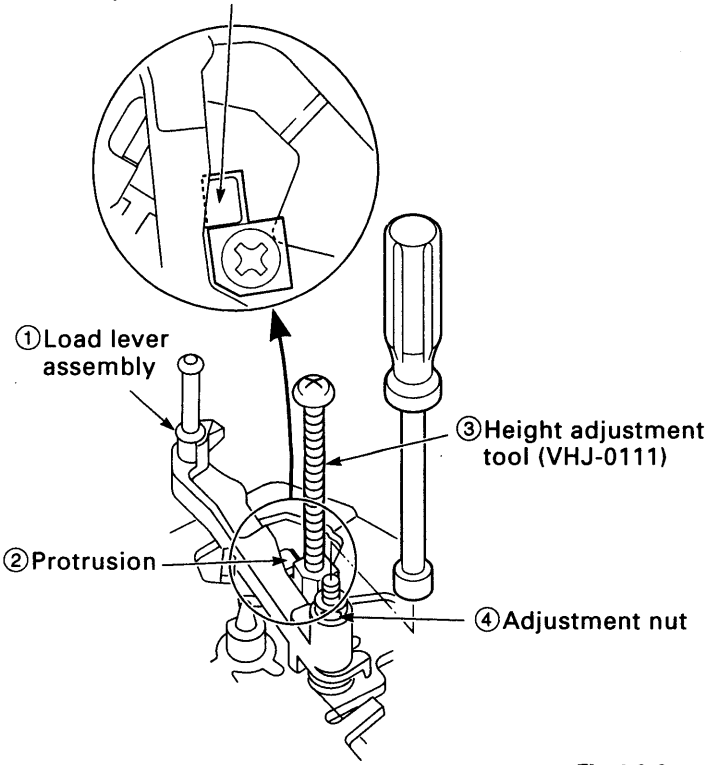


Fig.4-3-2

4-3-3. GUIDE ROLLER HEIGHT ADJUSTMENT (See Figs.4-3-3 and 4-3-4)

1) Playback the Alignment Tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is at its maximum at the tracking centre. Then, after loosening the S guide roller and the T guide roller by rotating them counterclockwise, tighten them in turn until the envelope waveform becomes flat. If the envelope waveform is not at its maximum at the tracking centre, refer to section 4-3-4 and carry out a rough adjustment of the horizontal position of the audio R/P head (ACE head) before adjusting the guide rollers.
2) Adjust the S guide roller.
   ① Playback the alignment tape (NTSC: VSJ-1001, PAL: VHJ-0052). Press the tracking (–) button, and check whether, when the envelope waveform has reached 50% of its maximum, the front half of the envelope waveform is flat. If not, fine-tune the S guide roller as follows.
   a. If the front half of the envelope waveform is as shown in Fig.4-3-4 (a), this means that you have pressed the S guide roller too far. Therefore, loosen it slightly, and when it is in the state shown in Fig.4-3-4 (b), tighten it again, stopping when the envelope waveform is flat.
   b. If the front half of the envelope waveform is as shown in Fig.4-3-4 (b), this means you have not pressed the S guide roller far enough. Therefore, tighten it slightly, stopping when the envelope waveform becomes flat.
   c. If the front half of the envelope waveform is as shown in Fig.4-3-4 (c), it may happen that when you tighten the S guide roller, the wrapper waveform does not disappear, but sinks into the flat part, as shown in Fig.4-3-4 (d). If this happens, the status shown in Fig.4-3-4 (c) is normal, so loosen the S guide roller, then tighten it again until the envelope waveform is as shown in Fig.4-3-4 (c).
   ② Check that at the tracking centre, the output of the front half of the envelope waveform is not less than 80% of the maximum.
   ③ Rotate the S guide roller 20° counterclockwise.
3) Adjust the T guide roller.
   ① Playback the alignment tape (NTSC: VSJ-1001, PAL: VHJ-0052). Press the tracking (–) button and check whether, when the envelope waveform is 50% of maximum, the back half of the envelope waveform is flat. If not, loosen the T guide roller slightly, then tighten it gradually until the back half of the envelope waveform becomes flat.
   ② Check that the output for the back half of the envelope waveform is at its maximum at the tracking centre.
4) Check that the envelope waveform does not fluctuate when you switch from CUE to PLAY or from REV to PLAY. If the front half of the envelope waveform does fluctuate, tighten the S guide roller 1° to 20°. If the back half of the envelope waveform does fluctuate, repeat steps 3) and 4).

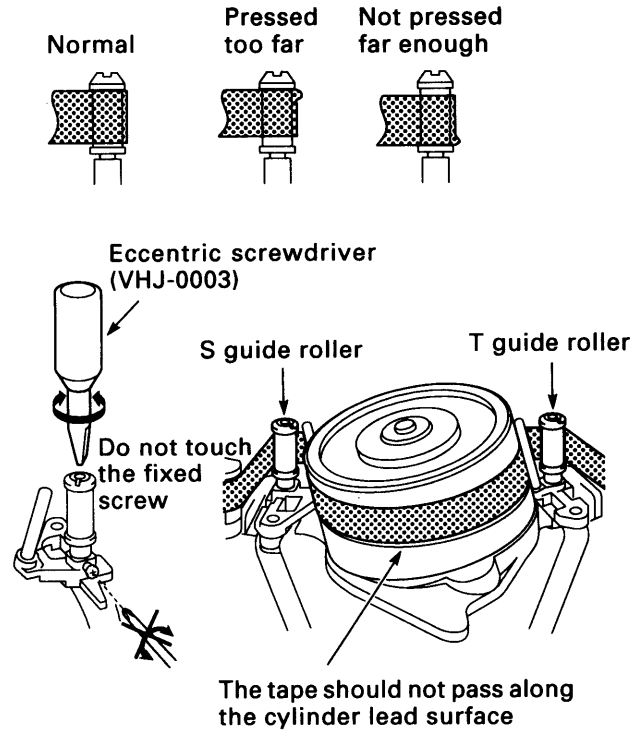


Fig.4-3-3

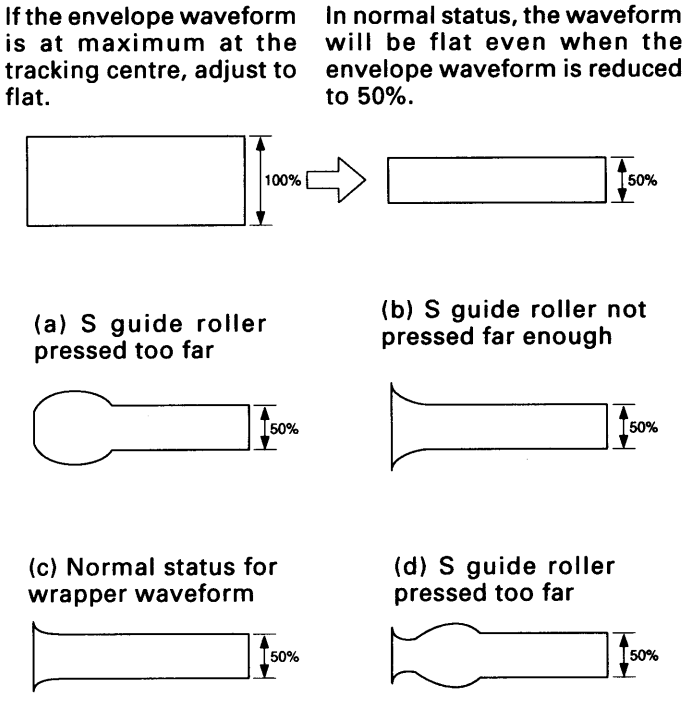


Fig.4-3-4

4-3-4. AUDIO R/P HEAD (ACE HEAD) HEIGHT ADJUSTMENT, AZIMUTH ADJUSTMENT AND HORIZONTAL POSITION ADJUSTMENT

(1) Hight/azimuth adjustment (See Fig.4-3-5)

1) Refer to section 4-3-3, complete the GUIDE ROLLER adjustment, and perform the AUDIO R/P HEAD adjustment.
   As the audio R/P head assembly (ACE HEAD) has been temporarily adjusted before shipment, do not rotate screws unnecessarily.
2) Mark screw Ⓐ, screw Ⓑ, and bracket with a waterproof marker so that their original positions can be known even after the screws are rotated.
   Marking screws Ⓐ and Ⓑ in the same direction will enable the adjustment mentioned later to be performed easily.
3) Play the adjustment tape (NTSC:VHJ-0005, PAL:VHJ-0008), and observe the audio output waveform using an oscilloscope.
   Loosen screw Ⓑ in the counterclockwise direction to decrease the audio output level. Then tighten it in the clockwise direction until the maximum level. Tighten further in the clockwise direction to decrease the level, and loosen in the counterclockwise direction until the maximum level.
4) Rotate screw Ⓐ in the same direction by the same degree as screw Ⓑ in step 1. (Check visually according to the mark made.)
5) Play the adjustment tape (NTSC:VHJ-0006, PAL:VHJ-0009), rotate screw Ⓒ, and maximize the audio output waveform (temporary azimuth adjustment).
6) Perform the adjustments in 3) to 5) again.
7) Perform fine adjustments using screw Ⓑ.
   Perform the same adjustments as 3), and if screw Ⓑ was adjusted by more than 30 degrees, perform the adjustment in step 4) again, and then perform fine adjustments.
8) Play the adjustment tape (NTSC:VHJ-0006, PAL:VHJ-0009), rotate screw Ⓒ, and maximize the audio output waveform (actual azimuth adjustment).

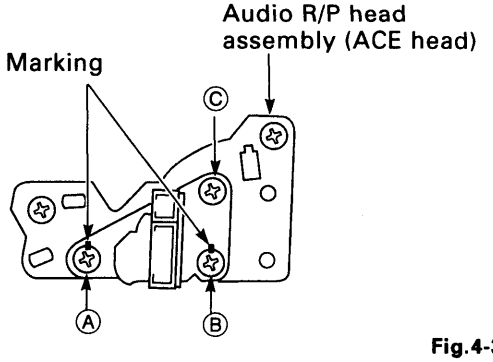


Fig.4-3-5

(2) Horizontal position adjustment (See Fig.4-3-6)

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009).
2) Press the tracking buttons (tracking + and tracking –) simultaneously and set the tracking to the centre.
3) Using an oscilloscope, observe the waveform of the video head output.
4) Loosen the two fixed screws on the audio R/P head (ACE head) by between 20° and 30° anticlockwise.
5) Using a slotted screwdriver, adjust the position of the audio R/P head (ACE head). At the position where the amplitude of the envelope waveform is at its maximum at the tracking centre, tighten the fixed screw on the audio R/P head (ACE head). When you do this, check that the envelope waveform changes equally whether the tracking is shifted by pressing the tracking button in the plus or the minus direction.
6) Play the alignment tape (NTSC: VSJ-1001 PAL: VHJ-0052) and check that the amplitude of the envelope waveform is at its maximum at the tracking centre. If not, repeat steps 1) to 6).
7) Refer to the electrical adjustments section of the service manual, and adjust the switching position of the servo circuit.

NOTE:

1. When you press the tracking buttons (tracking + and tracking –) simultaneously, the tracking is reset to the tracking centre. When the tracking is at the tracking centre, the message "T - : - " will appear in place of the clock display on the front panel. If you keep pressing the tracking – button the messages "T -: " and "T - -: " will appear, while if you keep pressing the tracking + button, the messages "T : -" and "T : - - " will appear. Three seconds after you stop pressing the tracking buttons, the clock display will re-appear.
2. The check described in paragraph 6) is not necessary for models in which the only tape speed is SP mode.

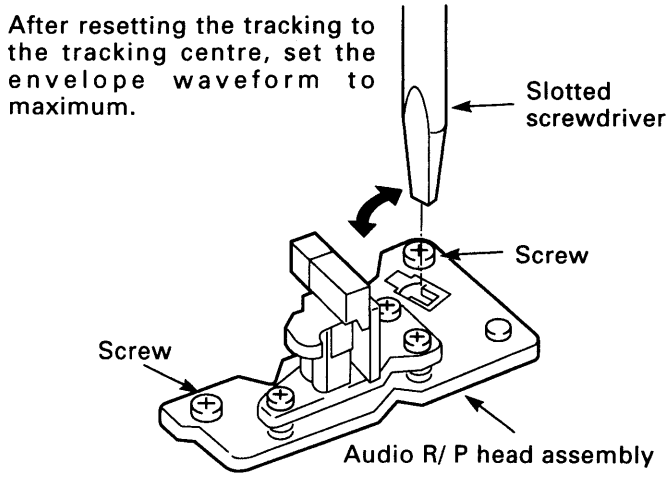


Fig.4-3-6

4-3-5. CHECKING AFTER ADJUSTMENT

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform.
2) Load a cassette tape (NTSC: T-120, PAL: E-180) and use it to record and replay. Check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform. (When recording on the tape, input 1kHz to the audio input terminal. Use a scratch-free cassette tape (NTSC: T-120, PAL: E-180).) Check that at the tracking centre, the front half down and back half down are not more than 20% of the value at the point where the envelope waveform amplitude is at its maximum.
3) Check that the envelope waveform is activated immediately when you switch from PLAY to REV or from REV to PLAY. Check that there is no slack in the tape next to the pinch roller.
4) Check that the envelope waveform is activated immediately when you switch to PLAY from FF, REW, CUE, REV or STOP mode. Check that there is no slack in the tape next to the pinch roller.
5) Check that the tape is not curling or riding up on the upper or lower flanges of the tape guides in PLAY, FF, REW, CUE or REV modes.
6) Check that in PLAY mode, the tape runs as shown in Fig.4-3-7.
7) Load a tape (NTSC: T-160, PAL: E-240) and play it back. carry out the checks described in steps 3) to 5) above.

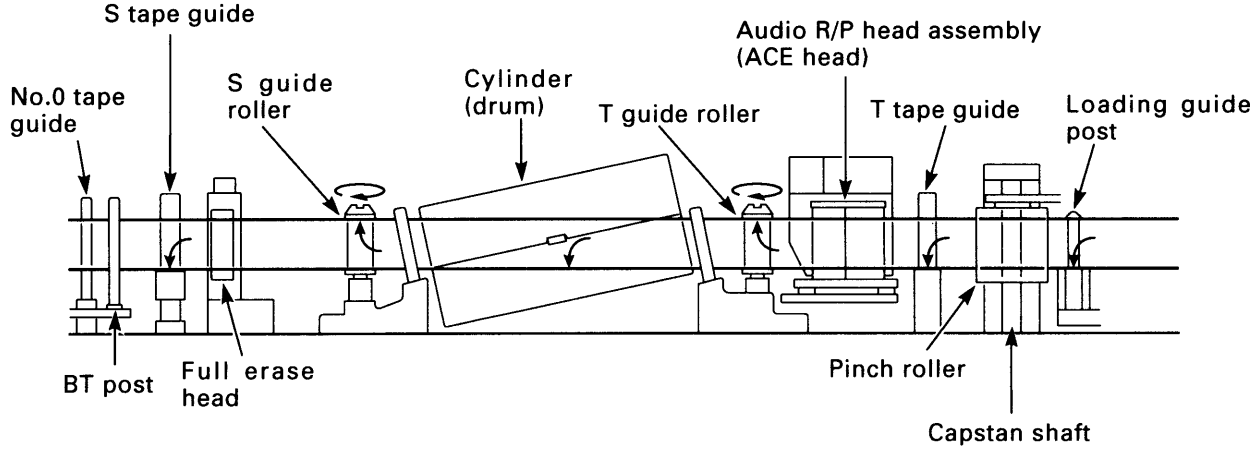


Fig.4-3-7

June/'97/2300 Printed in Japan

SANYO Electric Co., Ltd.
Osaka, Japan